LAKE SHAFER
LAKE ENHANCEMENT PROJECT

DESIGN DOCUMENTS

FOR

Shafer - Freeman Lakes
Environmental Conservation Corporation

JUNE, 1996

By

COMMONWEALTH ENGINEERS, INC.
Environmental Engineers & Consultants
Indianapolis, Indiana

TABLE OF CONTENTS

ENGINEERING REPORT

1. PRELIMINARY ENGINEERING REPORT

1.0 Executive Summary

The tributaries of the Lake Shafer watershed are mostly ditched and channelized regulated drains under either the jurisdiction of county drainage boards, multi-county drainage boards or private drainage boards. Due to the nature of these ditches, the most feasible locations to develop sedimentation basins of adequate size to reduce the rate of bedload sedimentation to Lake Shafer is at the mouth of each ditch where it empties into Lake Shafer. The basins must be installed within the major tributary embayments of Lake Shafer which have been identified as being significant contributors of sediment. The size and trapping efficiency of these basins must be optimized within the following design constraints:

- Dredging and sediment removal cannot be performed too close to existing boat docks and sea walls to prevent compromising the integrity of existing structures.
- Only that sediment for which adequate dewatering and disposal space has been secured can be removed.
- Budgetary constraints of sponsoring entities.

The following Lake Shafer tributary embayments are recommended for Phase 2 design and fall/winter construction of sediment traps for the Lake Shafer Lake Enhancement Project:

- Hoagland Bay
- North Bedford Bay/Big Monon Creek
- Little Monon Bay/McKillip Ditch
- Honey Creek Bay
- Keans Bay
- Carnahan Bay (if local match can be obtained)

Additional sites for the construction or installation of sediment control measures including Big Monon Ditch and the upstream portions of the tributary embayments listed above will be addressed in a Step 2, Phase 1 report to be prepared in the fall of 1995.

Following are estimated preliminary cost ranges for the sedimentation basins in each of the above listed tributary embayments, as well as totals for all of the proposed basins combined.

Trap Location	Preliminary Cost Estimate
Hoagland Bay	$160,741 - $212,580
Honey Creek Bay	$72,542 - $95,937
McKillip Ditch Bay*	$88,790- $249,100
North Bedford Bay*	$390,352 - $887,115

Keans Bay	$166,073 - $219,631
Total Step 1 Sediment Traps	$878,498 - $1,664,363

* The proposed design for these areas should have multiple (3) cells (due to the availability of construction space) for the addition or deletion of cells as the SFLECC budget allows. The low end of the cost range is for one (1) cell each. The high end of the cost range is for three (3) cells each.

1.1 Introduction

The tributaries of the Lake Shafer watershed are mostly ditched and channelized regulated drains under either the jurisdiction of county drainage boards, multi-county drainage boards or private drainage boards. Due to the nature of these ditches being very straight with high spoil banks on either side of relatively narrow waterways, they contribute a relatively large volume of sand to Lake Shafer. Much of the sand appears to come from ditch banks themselves, streambeds, and sand delivered to the ditches from drain tiles. There is limited opportunity to install structural sediment control measures within the ditches themselves due to their morphology. A more comprehensive evaluation of opportunities to install sediment control measures upstream of Lake Shafer will be addressed in a Step 2, of Phase 1 report. Step 2 activities will likely include recommendations for earth moving associated with ditch bank regrading or the development of constructed wetlands. Not only will sediment traps located within tributary embayments serve as emergency buffers to the lake from short term sedimentation but they also will serve as emergency traps for disturbances created to perform other conservation work upstream.

Each of the following tributaries has been identified as a significant contributor of non-point source water pollution to Lake Shafer either through this or previous studies. In the recently completed "T By 2000" Lake Enhancement Feasibility Study by K&S Engineering, the major contributing tributaries of Lake Shafer (exclusive of the Tippecanoe River) were ranked by their sub-watershed size and proportionally estimated annual rate of sedimentation as follows:

Rank	Tributary Name	Drainage Area	Est. Annual Sediment Trans. Rate ***
1	Big Monon Ditch*	184 sq. mi.	23.05 ac./ft./yr.
2	Hoagland Bay	70 sq. mi.	8.77 ac./ft./yr.
3	Big Monon Bay**	70 sq. mi.	8.77 ac./ft./yr.
4	Honey Creek	40 sq. mi.	5.01 ac./ft./yr.
5	Keans Bay	20 sq. mi.	2.51 ac./ft./yr.
6	Carnahan Bay	6 sq. mi.	0.75 ac./ft./yr.

* Big Monon Ditch will be addressed in Step 2 of Phase 1 of this project.
** Includes Big and Little Monon Creeks
*** Includes both suspended load and bed load, most suspended load may pass through Norway Dam during high flows. Bedload management is the focus of this project.

While these tributaries were ranked in the Feasibility study as indicated above, informal associations of homeowners in the vicinity a few of these major bay areas have indicated a willingness to provide partial financing for the construction of sedimentation basins in their respective embayments. This may change the prioritization for funding construction at the discretion of the SFLECC.

Following is a description of observations and strategies for each tributary identified as a major contributor of sediment to Lake Shafer. These tributaries are listed below in a clockwise order starting at Carnahan Ditch in the northeast portion of Lake Shafer.

1.2 Contributing Areas

A. Carnahan Bay

Based on observed field conditions a sedimentation basin to trap sediment transported by Carnahan Ditch should be located between the East Shafer Drive bridge and the mouth of Carnahan Bay where the bay drops into the Tippecanoe River channel within Lake Shafer proper. Because the bay area is relatively small and construction cost estimates are relatively high, This project will only be feasible if substantial local matching funds can be raised.

B. Keans Bay

Based on the following observed field conditions a Step 1/Phase 1 strategy for Keans Bay has been formulated:

- The upper portion of Keans Bay downstream of North Lake Road bridge is primarily a ditch for approximately 1,500 feet. This area is locally known as Doug's Inlet. Approximately 2,800 feet downstream of N. Lake Road bridge Keans Bay has a relatively narrow (or constricted) area that would make a good location for a submerged weir or native sediment berm for the downstream end of a sedimentation basin.

- It was observed that the water depth of Keans Bay was substantially deeper past the "necked down area". This is also confirmed by the map produced in the K&S Feasibility Study . In addition, during two separate major runoff events it was observed that the water coming into Keans Bay was relatively cloudy with suspended sediment until the water got past the constricted area. Past the constricted area of Keans Bay, the water color cleared up considerably. Actual sampling to quantify of suspended sediment or bedloads is beyond the scope of this study.

- Bottom composition was sand in the Doug's Inlet area (Keans Bay canal). Past the canal and past Cook's Point, the water cleared up

considerably and the bottom composition was silty sand to silt. Most of the suspended material appears to settle out prior to the water reaching the lower half of the open bay.

In conversation with the Cooks, owners of Cook's Point (at the end of Doug's Inlet, or the canal, at the east bank of canal), they claim that the sediment in front of their dock is sand rather than silt. It appears that the current forms an eddy around the vicinity of Cooks dock. In addition, locals claim that this is a swimming area used by several residents of the Bay due to the quality of the sandy substrate.

Phil Maloney a year round resident of Keans Bay, near the end of Doug's Inlet on the west bank (opposite Ron Stanley's property) has coordinated local residents of Keans Bay to obtain residential generated funding for dredging and disposal sites for the dredge spoil. Their main objective was to restore boating access to Doug's Inlet.

Mr. Maloney claims that construction access can be obtained from the lot north of his lot on the west side of Doug's Inlet. The owner of this lot is named Boruff. Mr. Boruff needs to be contacted for confirmation of construction access. Also deeds need to be obtained on the Boruff's lot, Dennis McIntire's lot, and Ron Stanley's lots (Ron Stanley and Dennis McIntire have agreed to have dredged sediment placed on their properties.

Dennis McIntire (Valparaiso permanent address - to be contacted) owner of 3827 N. Lake Road 26 East cabin, has a five acre +/- lot available for the disposal of dredge spoil. This site has been surveyed, and it is understood that he is willing to accept dredge spoil.

Ron Stanley also has several lots adjacent to the canal portion of Keans Bay (Doug's Inlet) which he has given permission to Commonwealth to use for dredge spoil disposal and for equipment access to the area to be converted to a sedimentation basin. Mr. Stanley will allow his boat dock to be removed for better access to the construction site. There are two drainage ditches on Mr. Stanley's property which could have a drain tile installed and be backfilled with sediment. There are several low places in the Stanley property which could accept a substantial quantity of fill.

Even with these two sites confirmed, there still needs to be more disposal space secure for the Kean's Bay sediment trap.

Design Notes - Sediment trap in Keans Bay

Dredging for this basin must stay at least 10 feet away from all private docks and seawalls to avoid compromising the structural integrity of these structures.

Ron Stanley's dock can be removed for access and dredging.

The basin should extend from the North Lake Road bridge to a constricted area half way up the open (lower or southern) portion of Keans Bay.

Keans Bay was identified as a major contributor of sediment to the lake, therefore, the design size should be optimized for efficiency and longevity.

C. Honey Creek Bay

1. Sedimentation Basin Sites

Immediately west of the West Shafer Drive bridge, continuing west to the island in the west end of Honey Creek Bay, is the proposed location for a sedimentation basin. This is the most feasible location for a basin to optimize trapping efficiency.

2. Sediment Disposal Sites

There is a considerable amount of property owned by the White County Board of Commissioners just south of Honey Creek Bay. On both sides (east and west) of the County Home is an upland ditch/gully which is relatively stable and has a considerable amount of volume potentially available for fill. However, permission has not been granted by the commissioners to fill the sites. Similarly, there is an upland ditch/gully running behind (north side) the Comprehensive Development Center (CDC). For each of these sites drainage would have to be provided by installation of drain pipes placed and bedded in the gullies.

Each of these sites is at least 1,500 feet from the proposed sediment basin location in Honey Creek. This is a relatively long distance to move wet sediment. However, these sites may be considered for final disposal sites after the dredged sediment has dewatered.

Upstream of Honey Creek Bay, along the south bank of Honey Creek Ditch (in the vicinity of the critically eroding banks of Honey Creek Ditch), along the south side of the Indiana Beach Campground, is the location of another potential sediment disposal site.

Residential property owners on the south shore of Honey Creek Bay have also expressed interest in accepting dredged sediment for fill.

D. Hoagland Bay

1. Background Observations

Due to the nature of the ditched watershed of Hoagland Ditch, relatively intense flows of water come into Hoagland Bay and subsequently on into

Lake Shafer after rain events. Most of the flow through Hoagland Bay is concentrated in the south half of the Bay area. Relatively high velocities are also entering the lake beneath the West Shafer Drive bridge resulting in a standing wave during runoff events. As a result, downstream of the West Shafer Drive bridge within Lake Shafer proper, is a very large sandbar which has developed over the years from sediment delivered to the Lake from Hoagland Ditch.

2. Proposed Sediment Trap

To prevent further increase in the filling of the Lake, a sediment trap should be developed within the limits of Hoagland Bay, west of West Shafer Drive. This sediment basin should have a constructed headwall (or cutoff wall) at the upstream end of the basin as well as an armored berm of existing sand, or other type of submerged weir, at the downstream end to serve as containment for trapped sediment.

This size and efficiency of this sediment trap would be optimized around the following limiting design criteria:

- Remove as much sediment as possible from the Hoagland Bay without compromising the structural integrity of existing sea walls, boat docks, side slopes and banks.

- Remove as much material as can be disposed of in legal and environmentally sensitive means.

3. Sediment Disposal Sites

Several residential property owners along the north shore of Hoagland Bay have expressed a willingness to accept dredged sediment for fill. More disposal space needs to be secured for construction of the Hoagland Bay sediment trap.

E. Big Monon Bay

1. General Background Observations

The entire Big Monon Bay appears to have experienced heavy sedimentation over the years. The sediment consists of finer silts in the majority of Big Monon Bay. At the mouth of the Big Monon and Little Monon (McKillip Ditch) Creeks, respectively, the initial embayments of Lake Shafer have filled in to an average depth of less than two (2) feet. The sediment in these areas is a combination of silt and sand. Most of the sand has settled out at the mouth of the streams to form deltas and sand bars. The silt has generally been transported further down the lake and deposited. Both of these (Big Monon and Little Monon) initial embayments

have evidence of being two of the most heavily sedimented areas of Lake Shafer.

F. North Bedford Bay (Big Monon Creek) Sedimentation Basin

The upper most embayment of Big Monon Bay, north of Monon Road, is the most suitable location to install a sediment trap on the lower Big Monon Creek. This area has naturally functioned as a sediment trap over the years. A trap should be installed here to preserve the depth of the lower Big Monon Bay which has been filling up with sediment. It is important to preserve the lower Big Monon Bay since a dredging project there would be very expensive given the apparent unavailability of disposal sites in the vicinity.

1. Sediment Disposal Sites

The joint owners of a farm near Big Monon Bay (Bowler Farms) have expressed interest in accepting sediment from the construction of the sediment trap. In addition, there is other property owned by SFLECC that may possibly be used for sediment disposal. More disposal space still needs to be secured.

G. McKillip Ditch/Little Monon Bay Sedimentation Basin

The upper most embayment of Little Monon Creek Bay (or McKillip Ditch) upstream of C.R. 300 East, is the most suitable location to install a sediment trap on the lower Little Monon Creek. This area has also naturally functioned as a sediment trap over the years.

1. Sediment Disposal Sites

The owner of a twelve acre vacant tract on the south side of Little Monon Bay has expressed interest in accepting an unlimited amount of dredge spoil from Little Monon Bay on his property. In addition, there is an 11 acre SFLECC tract that may be used for sediment disposal if it is not a jurisdictional wetland. A Buz Horton is another large landowner in the area. Perhaps an arrangement could be made with him. More sediment disposal sites may be needed.

1.3 Suspended Solids Analytical Data Summary

Sample Site	Date	Results (mg/l)
A.		
McKillip Ditch @ C.R. 175E	6/1/95	104
Hoagland Ditch @ C.R. 300E	6/1/95	72
Timmons Ditch @ N. Shafer Dr.	6/1/95	64
Big Monon Creek @ S.R. 16	6/1/95	24

B.

Big Monon Ditch	12/7/94	436
Hoagland Bay	12/7/94	256
Honey Creek Bay	12/7/94	184
Tippecanoe River	12/7/94	69
Carnahan Ditch	12/7/94	31
Keans Bay	12/7/94	30
Lake Shafer @ Lowe's Bridge	12/7/94	21
Big Monon Bay	12/7/94	19

The two separate sampling occasions were each after a major rain event, although of different magnitude, so the data cannot be directed compared between sampling occasions. However, the samples taken within the respective occasions can be compared to one another for a relative ranking of sediment transport.

Within sample occasion A, the McKillip Ditch falls into a relatively severe category of suspended solids transport. The Hoagland Bay, Timmons Ditch, and Big Monon Creek Sites fall into a medium severity category of suspended solids. This was a suspended sediment sample and not a bed load sample. Evidence exists at the mouth of each of these tributary embayments that there is substantial bedloading to the lake via these tributaries.

Within sample occasion B, the first three sampling sites represent a relatively high amount of suspended solids, the second one (Tippecanoe) a medium amount, and the last four fall into the relatively low amount grade of suspended solids. Again these samples were for suspended load only and do not quantify the amount of bedload transport. However, there is substantial evidence of bedload transport due to the existence of major delta areas a the mouth of each of the sampled tributaries.

1.4 Conclusions and Recommendations

It is recommended that the design and construction of the sedimentation basins proceed at these locations given the available space at these sites and their positions in the landscape. Being at the extreme downstream end of their respective sub-watersheds these are optimal sites for sedimentation basins. In addition, with the window of opportunity being available with the lake drawdown to perhaps work in dry conditions, this gives construction of sediment traps in the lake bed a higher priority.

While sedimentation basins are necessary to prevent the filling in of Lake Shafer (which is far more expensive to restore than to prevent) the traps are not a panacea for the Lake Shafer watershed sediment transport problem. These sediment basins should be considered a starting point for addressing the larger problem of watershed sediment transport. Additional measures must be taken upstream to preserve the new basins as well as the Lake Shafer proper to minimize the annual costs of sediment basin operation and maintenance.

SHAFER AND FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORP.
LAKE ENHANCEMENT PROJECT

SUMMARY - TRAP AND DISPOSAL SITES - WET (DREDGING) EXCAVATION METHOD
12/15/95

DSWET01.wk4

TRAP SITES		DISPOSAL SITES		COMMENTS ON DISPOSAL SITES		OTHER COMMENTS
LOCATION	VOLUME (CYS)	LOCATION	TOTAL VOLUME (CFS)	PROS	CONS	
1 Honey Creek	11,200	Honey Creek Bay Peninsula	8,000	Convenient location, Adjacent to site	If Owner wants to use it for temporary stockpiling; Will require double handling	
		Indiana Beach Property (Honey Cr)	25,250	Close to Site		
2 Hoagland Bay	18,600	CR 225 N at Honey Creek	22,000	Appears large enough to accept all material	Pumping distance is excessive (2 Miles)	Need another site within 1/2 mile of Project
		Indiana Beach Property (Honey Cr)	25,250	Appears large enough to accept all material	Pumping distance is excessive (2.3 Miles)	Need another site within 1/2 mile of Project
3 Little Monon Bay at McKillip Ditch	34,270	Pineview Golf Course	90,000	Appears large enough to accept all material	Pumping distance is excessive (6.7 Miles)	Need another site within 1/2 mile of Project
		Segal's Property	78,200	Appears large enough to accept all material	Pumping distance is excessive (8.4 Miles)	Need another site within 1/2 mile of Project
4 North Bedford Bay	140,645	SFLECC Property	34,500	Close to Site	Not large enough to serve entire trap site	Need to consider an additional site
		Pineview Golf Course	90,000	Appears large enough for much of the material	Pumping distance is excessive (7.9 Miles)	Need another site within 1/2 mile of Project
		Segal's Property	78,200	Appears large enough for much of the material	Pumping distance is excessive (9.6 Miles)	Need another site within 1/2 mile of Project
5 Keans Bay	23,600	Peter's Property	9,330	Close to Site	Unfavorable dewatering site	Need to consider an additional site
		Pineview Golf Course	90,000	Appears large enough for much of the material	Pumping distance is excessive (4.0 Miles)	Need another site within 1/2 mile of Project
TOTAL	228,315					

SHAFER AND FREEMAN LAKES
ENVIRONMENTAL CONSERVATION CORP.
LAKE ENHANCEMENT PROJECT

SUMMARY - TRAP AND DISPOSAL SITES - DRY EXCAVATION METHOD
12/15/95

DISDRY01.WK4

TRAP SITES		DISPOSAL SITES		COMMENTS ON DISPOSAL SITES		
LOCATION	VOLUME (CYS)	LOCATION	TOTAL VOLUME (CFS)	PROS	CONS	OTHER COMMENTS
1 Honey Creek	11,200	Honey Creek Bay Peninsula	8,000	Convenient location, Adjacent to site	If Owner wants to use it for temporary stockpiling; Will require double handling	
		Indiana Beach Property (Honey Cr)	25,250	Close to Site	May require hauling over local roads	
2 Hoagland Bay	18,600	CR 225 N at Honey Creek	22,000	Close to Site Under 2 Mile Haul Appears large enough to accept all material	Not Adjacent to Site Requires hauling over local roads	
		Indiana Beach Property (Honey Cr)	25,250	Close to Site (2.3 Mile haul distance)	Requires hauling over local roads	
3 Little Monon Bay at McKillip Ditch	34,270	Pineview Golf Course	90,000	Appears large enough to accept all material	Requires hauling over local roads Haul distance is excessive (6.7 Miles)	Need to consider another site that is closer
		Segal's Property	78,200	Appears large enough to accept all material	Requires hauling over local roads Haul distance is excessive (8.4 Miles)	Need to consider another site that is closer
4 North Bedford Bay	140,645	SFLECC Property	34,500	Close to Site	Requires hauling over local roads Not large enough to serve entire trap site	Need to consider an additional site
		Pineview Golf Course	90,000	Appears large enough for much of the material	Haul distance is excessive (7.9 Miles)	Need to consider another site that is closer
		Segal's Property	78,200	Appears large enough for much of the material	Requires hauling over local roads Haul distance is excessive (9.6 Miles)	Need to consider another site that is closer
5 Kearns Bay	23,600	Peter's Property	9,330	Close to Site	Requires hauling over local roads Unfavorable dewatering site	Need to consider an additional site
		Pineview Golf Course	90,000	Appears large enough for much of the material	Requires hauling over local roads Excessive haul distance (4.0 Miles)	Need to consider an optional site
TOTAL	228,315					

2. INSPECTION PLAN

2.1 Overall Description of Project and Quality Control Plan

A. Description

The five sediment traps described in the CONTRACT DOCUMENTS are designed to trap the bedload of sand delivered to each respective Lake Shafer tributary. These five project sites are:

1. Keans Bay sediment trap;
2. Hoagland Bay sediment trap;
3. Honey Creek Bay sediment trap;
4. McKillip Ditch Bay sediment trap, and;
5. North Bedford Bay sediment trap.

The sediment traps are similar in that each has a rock chute on the upstream end of the trap to serve to direct water into the trap and to control the erosive head cutting forces at the upstream end of the traps. In addition, there is a rip-rap lined berm at the downstream end of each trap to allow water to pass over the berm without eroding the outlet of the trap.

There are three primary activities in each sediment trap construction project area:

1. Construction of the rock chute in the upstream end of each trap.

2. Dredging of sand from the proposed trap site to create a pool to function as a sediment basin or trap. Side slopes os the dredged traps will be from 20% to 30% slopes to minimize potential bank stability problems.

3. Placing rip-rap over a berm at the downstream end of the sediment trap.

Note: In the Keans Bay project area the upstream end of the proposed sediment trap is located near the North Shafer Drive bridge. As back-up protection for the bridge, the Keans Bay project area also is designed to have steel sheet piling driven on the downstream side of the North Shafer Drive Bridge structure to prevent head cutting of the bridge footing. This is in addition to a rock chute protection system further downstream.

All existing stumps, snags and natural debris in the vicinity of the proposed construction sites are required to stay in the water to provide aquatic habitat. The natural debris may be moved around within the proposed traps as necessary to complete Work tasks.

In addition to the five sediment traps, sediment disposal sites must also be inspected. There are three primary activities to inspect at each of the sediment disposal sites:

1. Erosion and sediment control and containment. Including the control of erosive effects of decant discharge water. All dredged material must be contained within the area specified in the CONTRACT DOCUMENTS.

2. Final grading and reclamation of each sediment disposal site must be performed as specified in the CONTRACT DOCUMENTS. Restoration to pre-construction condition of ingress/egress roads and disturbed ground beyond the sediment containment sites.

3. Compliance with environmental permit conditions.

B. Quality Control Plan

The Contractor shall provide and maintain an effective quality control program. This program shall establish a means to perform sufficient inspection and tests of conformance to applicable Specifications and Drawings with respect to the materials, workmanship, construction, finish, and functional performance. This control will be established for all construction.

The Contractor shall furnish the Owner/Inspector, within thirty (30) days after receipt of Notice to Proceed, a quality control plan which shall include the procedures, instructions and reports to be used. This document will include as a minimum:

1. The Quality Control Organization;

2. Authority and Responsibilities of Quality Control Personnel;

3. Methods of Quality Control, including that for his subcontractor's Work;

4. Method of Documenting Quality Control Operation, and Inspection.

C. Authority and Duty of the Inspector

The Inspector(s) employed by the Owner is stationed on the Work sites to:

1. Keep the Owner informed as to the progress of the Work and the manner in which it is being performed.

2. Report whenever it appears that the materials furnished and the Work performed by the Contractor fail to fulfill the requirements of the Specifications and Contract.

3. Call to the attention of the Contractor any deviation from or infringements upon the Plans and Specifications.

4. Check and verify that the Contractor is keeping and maintaining Project As-Built Drawings.

Inspectors shall be authorized to inspect all WORK done and materials furnished and to exercise such additional authority as may be delegated to them in writing by the Engineer. Such inspection may extend to all or any part of WORK done and material furnished. They shall have authority to reject defective material and to suspend any WORK that is being done improperly, subject to the final decisions of the Engineer.

Such inspection shall not relieve the Contractor from any obligation to furnish acceptable materials or to perform all WORK strictly in accordance with the requirements of the Plans and Specifications.

Resident Project Inspectors shall not be authorized to revoke, alter, enlarge, relax, or release any requirements of the Specifications, nor to approve or accept any portion of the WORK, nor to issue instructions contrary to the Plans and Specifications. They shall, in no case act as foremen or perform other duties for the Contractor nor interfere with the management of the WORK by the latter. Any advice which Inspectors may give the Contractor shall in no way be construed as binding the Engineer or the Owner in any way, or releasing the Contractor from the fulfillment of the terms of the Contract.

The Owner, the Engineer, and his authorized Inspectors will at all times have access to the WORK, to determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS. If in the opinion of the Owner, the Engineer and his authorized Inspectors, the WORK is not proceeding in accordance with the CONTRACT DOCUMENTS, or the Contractor is utilizing undesirable construction practices, the Owner, the Engineer and/or through his authorized representatives, may direct the Contractor to cease WORK and correct all DEFECTIVE WORK and undesirable construction practices. The Contractor will bear all expenses for correcting DEFECTIVE WORK, and will bear any and all monetary losses and expenses relating to and resulting from ceasing of WORK because of DEFECTIVE WORK. Such expenses to also include compensation to the Owner for non-productive inspection expenses during the time lost while corrective DEFECTIVE WORK, the Contractor will not be granted an extension of the Project scheduled completion time.

D. General Inspection of Materials and Workmanship

All materials used in the construction of the Project shall be subject to adequate inspection in accordance with generally accepted standards, as required and defined in these CONTRACT DOCUMENTS.

The Contractor shall provide at the Contractor's expense the inspection services required by the CONTRACT DOCUMENTS.

If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, testing, or approved by someone other than the Contractor, the

Contractor will give the Owner timely notice of readiness. The Contractor will then furnish the Owner the required certificates of inspection, testing or approval.

Inspections, tests, or approvals by the Owner or others shall not relieve the Contractor from the obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

The Owner and the Owner's representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all WORK, materials, payrolls, records or personnel, invoices of materials, and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

If any WORK is covered contrary to the written instructions of the Engineer it must, if requested by the Engineer, be uncovered for the Engineer's observation and replaced at the Contractor's expense.

If the Engineer considers it necessary or advisable that covered WORK be inspected by others, the Contractor, at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the WORK in question, furnishing all necessary labor, materials, tool and equipment. If it is found that such WORK is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, if, however, such WORK is not found to be defective, the Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

E. Substitutions

Whenever a material, article, or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalog numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalog number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time.

2.2 Items of Work to be Inspected

Because the Contracts are set up on a lump sum basis the Inspector shall need to maintain records of the percent completion for each project site for comparison to Contractor's pay requests.

A. Lake Water Level

Northern Indiana Public Service Company (NIPSCO) is responsible for maintaining the elevation of Lake Shafer. There may be a possibility to lower the pool of the lake temporarily for certain phases of Work. Lake level adjustment must be arranged between the Owner, the Contractor, NIPSCO and Regulatory Agencies. There is no assurance lake water level can be lowered. The Contractor must assume that all Work may be performed with the lake at normal pool elevation. Other than pre-arranged lake drawdowns, the Contractor will be responsible for ensuring localized dewatering of sites during construction as needed.

All road surfaces used for equipment and machinery access shall be restored to original condition as required by the Specifications.

All turf or vegetation damaged by the Contractor for equipment and machinery access shall be restored to original condition as required by the Specifications.

The Owner's representative Inspector shall ensure Contractor compliance with his Quality Control Plan as submitted.

B. Keans Bay Sediment Trap

The items of Work to be inspected include the following items:

1. Sheet Piling Head Wall

- Layout of steel sheet piling headwall. Ensure that sheet piling does not contact any structure of the existing North Shafer Road bridge.
- Ensuring sheets are driven straight and plumb.
- Confirming sheets are driven to correct height. At least flush with the bottom of the existing streambed.
- Ensure the steel sheets are of proper length.
- Any and all welds shall be visually inspected.
- Dimensional lumber used for jigs and forms for driving and stabilizing steel sheeting shall not be treated with Chromated, Copper, Arsenate (CCA) which is toxic to aquatic life.

2. Upstream Rock Chute

- Location of rock chute.

- Geotextile and stone materials used as specified.
- Erosion control during construction.
- Key-way excavations at top and bottom of rock chute must be as Specified.
- Stone armoring must be of Specified sizes.
- Placement of stone must be as Specified and illustrated in Plans.

3. Sediment Basin Excavation

- Location of basin excavations.
- Side slopes must be as shown on Plans.
- Elevation of basin bottom excavations as shown on Plans.
- Monitor sediment volumes removed.
- Inspect for unusual or anticipated subsurface conditions.

4. Downstream Armored Berm/Submerged Weir

- Location of downstream berm.
- Construction of berm/weir top surface must be level throughout its length.
- Geofabric as Specified shall be installed beneath the entire area proposed to receive rip-rap.
- Stone armoring must be of Specified sizes.
- Placement of stone must be as Specified and illustrated in Plans.

C. Hoagland Bay, North Bedford Bay, McKillip Ditch Bay, Honey Creek Bay Sediment Traps

The Work to be inspected include the following items:

1. Upstream Rock Chute

- Location of rock chute.
- Geotextile and stone materials used as Specified.
- Erosion control during construction.
- Key-way excavations at top and bottom of rock chute must be as Specified.
- Stone armoring must be of Specified sizes.
- Placement of stone must be as Specified and illustrated in Plans.

2. Sediment Basin Excavation

- Location of basin excavations.
- Side slopes must be as shown on Plans.
- Elevation of basin bottom excavations as shown on Plans.
- Monitor sediment volumes removed.
- Inspect for unusual or anticipated subsurface conditions.

3. Downstream Armored Berm/Submerged Weir

- Location of downstream berm.
- Construction of berm/weir top surface must be level throughout its length.
- Geofabric as Specified shall be installed beneath the entire area proposed to receive rip-rap.
- Stone armoring must be of Specified sizes.
- Placement of stone must be as Specified and illustrated in Plans.

D. Sediment Disposal Site Inspection

The Work to be inspected include the following items:

1. Dredged Material Transport, Disposal, and Storage

- Any and all material removed from sediment basin construction sites must be placed in disposal sites designated on Construction Plans.
- Transport of dredged material between the point of excavation and the designated point of disposal must be not be spilled, seeped, leached leaked, or otherwise discharged anywhere other than the designated disposal sites as depicted on the Construction Plans.
- Dredged material conveyances must not pose a traffic hazard or unduly impede traffic flow.

2. Sediment Containment

Contractor must contain all sediment deposited at a site within the limits of the disposal site as depicted by the Engineer on the construction plans. Contractor shall remove any sediment and repair any damage to property outside of the area specified to receive dredged sediment or areas authorized by a written easement for ingress and egress. The Inspector shall observe all disposal sites for compliance with the construction plans, specifications and environmental permit conditions and notify the Contractor if material or equipment are outside of the specified Work area(s).

3. Compliance With Environmental Permit Conditions

It shall be the responsibility of the Contractor to ensure full compliance of environmental permit conditions for each construction site. The Inspector must note the manner of conveyance of dredged materials. The deposition of dredged materials at each sediment disposal site must be inspected to ensure compliance with the conditions of U.S. Army Corps of Engineers permit conditions, Indiana Department of Environmental

Management permit conditions, and IDNR permit conditions where applicable.

Most environmental permit conditions concern the containment of sediment on disposal sites to prevent the off site transport of sediment into water bodies. The Inspector must inspect all construction and disposal sites for erosion control on a daily basis under wet excavation conditions.

4. Compliance With Landowner Conditions

Each owner of sediment disposal sites have specific site conditions that need to be met in the access, methods of disposal and finished grades and conditions of the property. It is imperative for the Inspector to ensure that the conditions of the owners of the sediment disposal sites are being fulfilled by the Contractor(s)both during and after construction.

2.3. Contractor's Layout and Staking

The on-site Inspector is not responsible for the correct layout and staking of the project. This is the responsibility of the Contractor, however, the following information is provided to the Inspector for guidance and advice in the event the Contractor should need it.

A. Horizontal Layout of Features for Sediment Traps and Disposal Sites

The Inspector shall observe and\or check the horizontal (lateral) layout and staking performed by the Contractor for all structural and nonstructural features to ensure compliance with CONTRACT DOCUMENTS.

B. Vertical Layout of Features for Sediment Traps and Disposal Sites

The Inspector shall observe and\or check the vertical (elevational) layout and staking performed by the Contractor for all structural and nonstructural features to ensure consistency with CONTRACT DOCUMENTS. Temporary bench marks (TBM's) are provided on the Plans and marked in the field for use in laying out the vertical locations of all Work.

2.4 Contractor's Maintenance and Development of As Built Drawings

While it is the responsibility of the Contractor to develop and maintain As-Built drawings for each phase of construction, the on-site Inspector is also required to maintain copies in clear readable order on the project site for the inspection by any interested party.

The Contractor shall keep one (1) copy of all project Specifications, Plans, Addenda, Modifications, Supplemental Drawings, Shop Drawings and Change Orders at the project site in good order and annotated to show all changes made

during the construction process. In addition, the Contractor and Inspector shall keep one (1) set of "As-Built Drawings" for the project.

These As-Built Drawings will show all final elevations, all final dimensions, sizes and depths for buried steel sheeting, stone keyways, members, structures, and all other information as necessary to constitute as-built records. These documents shall be kept daily by the Contractor and be made available to the Inspector and routinely checked by the Inspector for completeness and accuracy based on the Inspector's daily records and notes. It will be the Contractor's responsibility to furnish any and all information lost due to the Inspector's loss of these record drawings and vis-a-vis. In addition to other Contract requirements, retainage will be partially based on the Contractor's and Inspector's ability to maintain good As-Built records, as determined by the Owner. Upon completion of the project these record "As-Built" drawings together with any other annotated supplemental plans, drawings, sketches, etc. shall be delivered to the Owner for his final review and approval. If approved, the documents will be delivered to the Engineer for the Owner's record. If disapproved, they will be returned to the Contractor for corrections, as necessary.

2.5 List of Inspector's Equipment

All persons providing construction inspection services shall have available at all times the following minimum list of equipment:

- A surveying level, tripod, and measurement rod in good Working condition.
- Fiberglass or steel measuring tapes.
- Depth staff gage.
- Note/journal keeping materials and hand calculator.
- A four foot level/plumb rule in good operating condition.
- Materials to develop and maintain As-Built Drawings.

2.6 Required Qualifications of Inspectors

All persons performing inspection services shall have the following minimum qualifications:

- Demonstrated expertise/documented experience in the establishment of vertical and horizontal control.
- Experience in the inspection of hydraulic or below water surface excavations.
- Experience in the inspection and/or installation of geofabric and rip-rap for erosion control.
- Knowledge and experience in environmental permit compliance.

3. OPERATIONS AND MAINTENANCE PLAN

3.1 Description of Maintenance Work to be Performed

The following report comprises the Engineer's suggested methods, strategies, and timing of operating and maintaining the bedload sediment control structures designed for the joint SFLECC/IDNR "T By 2000" Lake Enhancement Program project. The sediment control structures have been designed to require a minimum of operator attention, provide operator safety, and minimize long term maintenance attention between basin cleaning periods.

The maintenance to be performed is primarily the periodic removal of accumulated sediment from the sedimentation basins. If the SFLECC, as Owner, decides to have the basins dredged with land based earth moving equipment then the basins will have to be dewatered via lowering the level of Lake Shafer. Otherwise hydraulic dredging equipment must be utilized.

Following is a description of the tasks anticipated to properly operate and maintain the sediment control structures so they provide long term service operating at peak efficiency.

- Inspection/repair of rip-rap and erosion control measures on rock chutes and downstream armored berms/submerged weirs.
- Periodic removal of sediment from basins.

A. Inspection/Maintenance of Sediment Basin Rock Chutes

Generally accepted design methods have been employed in the design of the sedimentation basins and rock chutes. While it is not expected that the rock chutes will have to be adjusted or maintained, it is good practice to inspect the rock chutes periodically. Site conditions may change from either natural or manmade causes which may cause the need for maintenance or repair of the rock chutes. While damage to a rock chute is highly unlikely, flood events are the most likely source of damage to a rock chute. Therefore, inspections need only be performed after significant storm events and after lake level lowering when structures are visible.

B. Periodic Sediment Removal

The sediment basins are designed to catch bedload sediment transported from the watershed preventing the material (primarily sand) from being delivered to Lake Shafer. The basins are designed to fill up and to require periodic maintenance.

3.2 Projected Maintenance Cycle

It is recommended that the operator be equipped with the following equipment:

- jon boat

- staff gage or fiberglass level rod

A. Inspection of Rip-rap and Erosion Control Measures

All exposed rip-rap should be inspected for stability on an annual basis. Any rip-rap that is misplaced or that has been moved should be replaced. inspection with the water level at normal pool can be performed utilizing a probe rod or bar t feel for dislodged or missing stones, and test for stability.

Any time the lake is temporarily dewatered, all rip-rap erosion control measures should be inspected and where stones have been moved they should be replaced with heavier stones. Where erosion has occurred, protective measures should be installed to protect from further erosion.

B. Periodic Lowering of Lake Shafer Water Level

Northern Indiana Public Service Company (NIPSCO), owners and operators of the Norway Dam, would have to lower the level of Lake Shafer. NIPSCO has no set schedule for lowering the lake level. It is generally only done on an as-needed basis for dam or generator maintenance. Maintenance inspections of all structures should be performed any time the lake levels are lowered.

Even if the basin maintenance sediment removal is to be done using a hydraulic dredge, it is good practice to draw down lake levels periodically to expose lake sediments to the atmosphere. This oxidizes the sediments, in an ordinarily reduced environment, enhancing the bonding of nutrients to the sediment particles.

If the lake was drawn down to completely dewater the basins the operator would have to pump remaining water from the basins since the bottom of the basins is below the upstream and downstream lake bed elevations.

3.3 Periodic Removal of Accumulated Sediment from Basins

A. Timing of Periodic Maintenance

Sediment traps designed to trap bed load transport of sediment typically only need to be cleaned when the bottom of the basin is slightly below or to surrounding grade.

The Engineer's suggested timing of periodic maintenance is based on the use of widely accepted, statistical modeling calculations of when the sediment control basins will be filled to slightly below or at the surrounding grade.

These models were developed by the SCS based on empirical data from experimental sedimentation basins in situations similar to those found in this watershed.

The calculations used for modeling the trapping efficiency and rate of basin infilling are from the National Engineering Handbook, Section 3, Sedimentation.

The in-basin sedimentation rate and subsequent timing of periodic maintenance, has been calculated using values assumed from existing conditions. Soil loss rates are expected to decrease, due to improved land treatment and stabilization projects in the watershed, the existing condition values have been used for projections for the following reasons:

1. Even after proposed watershed stabilization measures are in place, it will take several years for the stream systems to flush the transitory sediments stored in the steam beds. To estimate the time required for the incoming stream systems to reach a new equilibrium with their watersheds are far beyond the scope of this project.

2. Using existing conditions a conservative "worst expected case" condition. This allows the Owner to plan manpower and budget conservatively.

   The actual time it takes for the basins to become full of sediment may be slightly different. However, for project planning and budgeting purposes it is recommended that the Owner use the Engineer's projected periodic maintenance schedule until more accurate information becomes available.

   It is recommended that when the basins are dredged, as much sediment as possible be removed (without destabilizing side slopes) to increase the volume, thus trapping efficiency, of the basins.

   Some quantitative assumptions on variable conditions in the subject watersheds had to be made to provide values to plug into the models. The assumptions used in the sedimentation rate calculations are as follows:

Table 1
Estimated Periodic Maintenance Schedule and Costs for Sediment Traps
(Assuming Hydraulic Dredging is Used)

Location	Maintenance Period (years)	Sediment Trapped (acre feet)	Estimated Cost (1996)	Annualized Cost (factor @ 4%)
Honey Creek Bay	6	6.51	$68,312	$13,031
Hoagland Bay	6	10.75	$112,727	$21,504
Little Monon @ McKillip Ditch	8	17.96	$188,379	$27,980
North Bedford Bay (Cell 3 Deleted)	15	57.72	$605,325	$54,443
Keans Bay	12	14.43	$151,304	$16,121
Total		**107.37**	**$1,307,086**	**$167,614**

B. Costs of Periodic Maintenance

Costs are presented both in terms of total construction costs needed for each area and the annualized cost that will need to be collected and invested each year. Sediment trap sizing was and maintenance intervals calculations were calculated using a diminishing efficiency model with a minimum efficiency of 1%. This requires a minimum maintenance interval of 6 years for both Honey Creek Bay and Hoagland Bay and 8 to 15 or more years for the other bays.

An annual inflation adjustment rate of 4% was used in the calculations for financial planning of annualized costs. At this rate approximately $168,000 would have to be placed in reserve or invested each year in order to have sufficient funds to finance maintenance of the sediment traps over the next twelve years. This will also provide funding for the maintenance of Honey Creek Bay and Hoagland Bay on six year cycles. It is recommended that the maintenance fund be invested in an interest bearing account to offset the rate of inflation.

3.4 Maintenance Strategies and Contracting

A. Spatial Distribution of Sediments

The Soil Conservation Service, through empirical evidence, has determined that in impounded water reservoirs, with watersheds of moderate relief in which the incoming sediments consist of sands and fine silty soils, bed load scour transport of sediment is a significant eroding agent with sediment being scraped along the tributary channel beds.

Because Lake Shafer and its watershed have these characteristics the proposed constructed sedimentation basins are designed to manage bed load, or primarily sand. It is estimated that very high percent of the bed load sand will be trapped in the sediment traps.

Generally, the larger denser sands will be the first particles to settle out of the water column. Therefore, these are typically located in the upper end of the sediment trap. Smaller, finer, siltier particles are found typically trapped in the downstream ends of the basins. The two sediment traps with a shorter maintenance life will likely only trap sand and insignificant quantities of fine silts.

B. Sediment Removal Methods

There are three main methods of sediment removal, hydraulic dredging, drag-line dredging, and land based excavating with earth moving equipment. Any of which will remove the sediment from the basins.

The driving variable in which method to utilize is the lake level. Hydraulic dredging must be used in the event the maintenance must be done with the water level at or near normal pool elevation. The Engineer suggests that the Owner coordinate with the dam operators to arrange the maintenance schedule to coincide with lake level lowering as much as

possible. This gives the Owner the greatest number of options in Contractor selection and allows cost to better dictate which is the most efficient method for maintenance sediment removal. The Owner should have Contractors submit a Plan of Operation, detailing the specifics of their proposed operation, with any bid to perform sediment removal and disposal.

Each method of sediment removal has a variety of advantages and disadvantages to consider. These advantages are outlined in the following discussion.

1. Hydraulic Dredging

Hydraulic dredging uses a floating platform with a mechanical cutter-head and pump are best for cutting lake bottom sediments and pump a slurry to a dewatering or disposal site.

a. Advantages

Advantages to hydraulic dredging include the following:

- The maintenance dredging can be done any ice free time of year since lake dewatering is not required.
- It is generally cheaper since there is typically fewer machines and personnel on the project site.
- Does not require heavy vehicular traffic for removal of spoil.
- Small portable equipment is relatively common.
- Relatively maneuverable.

b. Disadvantages

- Difficult to access smaller waters without developing launch facilities.
- May have difficulty in water less than two feet deep.
- Sometimes slower than land based machinery.
- Some limited resuspension of fine sediments into the water column and associated liberation of nutrients from sediment particles.
- Pumping rate must be balanced with inflow to the lake to prevent excessive drawdown of the water level.
- Temporary, localized destruction of benthic habitat and food chain. Generally not a problem in sediment traps or heavily silted lake bottoms.
- The disposal site must be adequately sized to facilitate settling rates even after considerable sediment has been pumped into the basin. Disposal sites must be sized for end of project efficiency.
- The slow settling rates of fine sediments in a slurry dewatering pit or lagoon may drastically slow down the rate of pumping to the dewatering facility.

- A temporary NPDES permit may be required for a point source return flow pipe.

2. Drag-Line Dredging

a. Advantages

- Leaves rough uneven bottom for habitat variation.
- Spoil can be loaded from shore for off-site disposal.
- Can operate in relatively confined spaces.

b. Disadvantages

- Difficult to achieve proper side slope cut.
- Drag-lines, generally, tend to be relatively slow.
- Land based with a limited reach.
- Piles spoil up along shore in front for dewatering and later transportation for disposal.
- Tends to not efficiently grab highly flocculent sediments.
- Considerable spillage.

3. Land Based Earth Moving Equipment

Land based removal of sediments involves draining the lake and allowing ample dewatering for lake bottom to support machinery weight. Then excavating the sediments with low ground pressure (e.g., long track bulldozers) earth moving equipment, loading into dump trucks and disposing of the sediment off site.

a. Advantages

- Can move large quantities of material relatively quickly if suitable conditions prevail.
- Dredge spoil can be transported to different areas for beneficial reuse, such as topsoil.

b. Disadvantages

- Trucking and machinery costs to remove sediments from the project site to disposal site may be high.
- Heavy truck traffic may cause damage to roads and bridges.
- Requires lowering lake levels and management of incoming water.

3.5 Disposal of Dredge Spoil

A. Permitting for Dredging and Disposal of Spoil

The dredging operation will require a permit from the U.S. Army Corps of Engineers, since Lake Shafer is considered to be "waters of the United States" under the Clean Water Act. This permit is required even when dredge spoil is disposed on an upland site.

Based on previous experience of CEI on similar projects in similar areas, It is not anticipated that a permit will be needed from the Indiana Department of Environmental Management (IDEM) for land disposal of dredge spoil.

Most lake sediments in rural areas have relatively low or undetectable concentrations of substances regulated as hazardous waste. Therefore, the material can be disposed of in almost any upland site without acquiring an IDEM land application permit. According to the Owners, the sediments have been analyzed for classification as hazardous material or otherwise needing special handling., The sediment is reportedly clean for land disposal.

Disposal of dredged material into the main body of Lake Shafer is not considered a feasible option. Disposal into a wetland, navigable waterway, or other waters of the U.S. will require a permit from the U.S. Army Corps of Engineers. These are generally not feasible disposal sites.

The most frequently used method of disposal for hydraulically dredged sediments involves the construction of a temporary diked, basin, on an upland site, to hold and dewater pumped slurry. The temporary basin may be partitioned for cells with an outlet structure and discharge pipe to release decant water from the basin after most of the sediments have settled out of the water column. The dewatering outlet can either be a pipe delivering water back to the lake or stream, or, the water may be discharged on the ground surface and allowed to drain back into the lake via overland flow (assuming there is little flow velocity). Overland return flow has two advantages over piped return flow:

1. Overland return flow allowed to drain over vegetated land is further filtered of sediments prior to its discharge back into the Lake.

2. The discharge of return flows from a point source (pipe outfall) may require a temporary NPDES permit to discharge from the IDEM. There could be strict suspended solids limits in such a permit that would require more expensive treatment of the return water. This could involve either: applying a flocculent to the basin to precipitate (coagulate and settle) sediments from the basin water column; or, sizing the basin and timing the operation of the dredge such that the water is allowed longer residence time in the basin for increased sediment fallout. Increased basin sizing could make a temporary basin difficult to site and require a much longer pumping distance.

B. Disposal of Dredge Spoils

Once dredge equipment has been selected for the project, disposal sites must be identified. If hydraulic dredging is to be performed a dewatering/disposal site must be designed with the appropriate size, containment and outlet structures. Preferably sediments should be disposed outside the watershed (where feasible), or at least in an application protected from erosion and transport back into the lake.

Careful consideration must be given to disposal of excavated materials to minimize costs. An upland site is preferred. Disposal of hydraulically dredged material requires a dewatering and disposal site such as construction of a temporary basin(s), a dry pond or a water and sediment control basin (WASCOB). Disposal sites should be rotated, if possible to minimize the wear and tear on roads, if trucked, or to allow adequate dewatering and retention time if pumped.

Potential disposal sites include sites utilized in the initial basin construction. Local County Highway Departments generally have local landowners requesting dredged material be dumped on their property for fill. Dredged material removed from the basins may be in high demand locally as topsoil or a soil amendment by persons capable of self hauling.

The disposal of dredged material can account for half of the total cost of sediment removal operations. If the Owner wishes the dredge spoil can be left piled at an accessible site available to self-haulers for a giveaway program. Otherwise it can be specified in contract documents that the Contractor is responsible for removal and disposal of all spoil. Regulatory agencies typically require submittal of a sediment disposal plan.

3.6 Estimated O & M Costs per Year

Table 1 on page 3-3, provides cost estimates for sedimentation basin cleaning. These costs were prepared assuming that hydraulic dredging would be utilized to remove sediment. This was assumed since the SFLECC will have very little control or influence over the timing of lowering Lake Shafer. The contracts from initial sedimentation basin construction will provide accurate cost data. Adjustments must be made for inflation.

Environmental permits for basin cleaning may have to be obtained. The costs will be approximately the same as permitting costs in the design phase for sediment basin construction.

The Engineer recommends the Owner advertise for bids from qualified, responsible Contractors without specifying the precise type of equipment to be used if the lake is to be lowered. Otherwise only hydraulic dredging can be used where land based reaching equipment will not reach. The bid documents may specify that the Contractor is responsible for arranging the timing and operation of the sediment removal to not disrupt the normal use of the lake during the high use season. For example, if the operation requires dewatering this should be done after labor day, but if sediments must be trucked from the site the Highway

Department may require the Contractor to wait until after the third week of April when the roads are more capable of supporting the loads.

It is recommended that the Park Board retain an engineer/consultant to obtain permits, and to develop the contract documents and specifications for the periodic sediment removal operation.

4. POST CONSTRUCTION MONITORING PLAN

4.1 General

Two approaches can be taken to the monitoring component of the Lake Shafer Lake Enhancement project.

A. Post construction monitoring of overall lake water quality response.

B. Monitoring the rate that sediment accumulates in constructed sediment traps.

In the first approach described above, it is assumed that the overall lake water quality monitoring performed by the White County Health Department will continue, thus satisfying this the component of monitoring overall lake water quality.

The 1988 EPA Lake and Reservoir Restoration Guidance Manual has a section on postmonitoring of lake restoration projects. It is suitable for monitoring overall lake water quality improvement resulting from implementation of restoration practices. The Guidance Manual contains a table listing a sampling protocol for overall lake monitoring. In addition to the above referenced manual, the EPA has also published a Technical Supplement to the Manual entitled Monitoring the Lake and Reservoir (document number EPA 440/4-90-007).

The post construction monitoring plan that follows will focus on the second approach. Monitoring the rate of accumulation of sediment in the constructed sediment traps.

A plan to monitor the success of lake enhancement projects must contain four key elements:

A. Qualified personnel to perform the monitoring;

B. Clearly defined monitoring objectives with a specific set of monitoring parameters;

C. A monitoring schedule;

D. A reporting format.

4.2 Qualified Personnel

Personnel monitoring the success of the constructed sediment basins should have the following qualifications:

- General knowledge of lake ecosystem functions.
- Familiarity with the objectives to be achieved by the sediment traps.
- Familiarity with principles of sediment transport by waterways.

- General familiarity with the Lake Shafer watershed and soil types.

Persons qualified to perform part or all of the monitoring may include:

- Professional environmental scientists such as Commonwealth Biomonitoring staff.
- White County SWCD staff.
- A trained surveyor, such as Commonwealth Engineers, Inc. staff.

4.3 Monitoring Objectives

The objective of this monitoring program is to ensure that the sediment traps are actually trapping bed load sediment as they were designed. In order to monitor the effectiveness of sediment traps, a set of monitoring parameters must be defined. In monitoring the effectiveness of the sediment traps the rate of basin in-filling is the only parameter that needs to be routinely performed.

As Built plans will be maintained during and shortly after the construction of the sediment traps. These As-Built plans should be used as the basis for resurveys of the sediment traps to measure basin in-filling rates.

Many times As-Built plans of dredged lake bottom will include charts from a calibrated recording sonar unit operated at a given speed over given transects of the portion of the lake dredged. In these instances the monitoring program is no more involved than annually duplicating the recorded transects with a calibrated recording sonar unit to measure the change in transect depth and thus basin volume.

A good sediment trap monitoring program should include the following four elements:

A. Utilize Existing Mapping

Using the maps from the design phase plans or As-Built construction plans, or an aerial photograph, mark a known straight line distance on the map for calibration. Mark off and measure transect lines across the sediment trap to be monitored. The distance between the transect lines will vary depending on the size of the specific sediment trap that is being monitored. The closer the transect lines are to one another, the more accurate the map. A distance of from 30 to 100 feet between transect lines is reasonable for the size sediment traps to be constructed at Lake Shafer. The configuration of each sediment trap will affect the planned transect pattern.

B. Benchmarks

A benchmark must be established on the lakeshore for use as a reference to record lake level at the time transect depth measurements are taken, whether measurement is by staff gage or by sonar soundings. Obtaining lake level data from the dam

operator is crucial but may not be completely accurate for basins located in the upper reaches of the lake given the nature of watershed hydraulics. The construction plans for the sediment traps illustrate the locations of benchmarks (BM) and temporary benchmarks (TBM) used in the design of the sediment traps.

C. Sonar Transects

Transect markers should be established on the lake shore, based on whatever map or aerial photo the monitorer selects as a base map. A boat with a sonar and strip recorder, or sonar and Global Positioning System (GPS), should traverse between the two established markers at a given slow steady speed. It is imperative to calibrate the sonar unit each time due to differences in the depth in the water of the sonar transducer.

D. Lake Map

Using the calibrated aerial photographs or As-Built plans as a base map, and the data from either a strip chart of a recording sonar unit or from a GPS/sonar unit, plot the depth to sediment surface along each transect. When all the depths are recorded along the transects, join the identical depths (e.g., all of the 2 foot depths) to form a bathymetric map of the sediment basin. The map can be used to determine the amount of sediment accumulated over a given period of time (or rate of sediment accumulation). This information can then be used for more accurate maintenance interval data.

4.4 Monitoring Schedule

The monitoring should be performed, at a minimum, on an annual basis. While the spring months are generally the months of greatest rainfall and sediment transport fall is the period of water quiescence and therefore may be the easiest time to perform the monitoring.

4.5 Reporting Format

The reporting of field measurements and observations should be done on standard forms and maps generated by the person designated responsible for the monitoring and reporting of results. Care should be taken so that data from monitoring the sediment traps can be used in a comparison to overall lake water quality postmonitoring results performed by the White County Health Department.

All field data sheets should be copied and stored in a three ring binder for annual compilation and analysis. Results of each monitoring should be tabulated so that comparisons between monitoring inspections are presented in only a few tables.

APPENDIX "A"

WETLAND DELINEATION REPORT

SHAFER-FREEMAN LAKES ENVIRONMENTAL
CONSERVATION CORPORATION

WETLAND DELINEATION REPORT
at
PROJECT SITES: HOAGLAND BAY SEDIMENT TRAP and NORTH BEDFORD BAY SEDIMENT DISPOSAL SITE

September 1995

COMMONWEALTH ENGINEERS, INC.

September 18, 1995

To: **Ms. Pat Rucker**
U.S. Army Corps of Engineers
P.O. Box 59
Louisville, KY 40201-0059

Subject: Wetland Delineation for Sediment Trap Construction Project ID No. 199501210

Dear Mr. Coates:

Pursuant to your September 12, 1995 request for a wetland delineation, Commonwealth Biomonitoring, Inc. (CBI) staff have completed a delineation of the wetlands located on the subject sites where jurisdictional wetlands may exist. These properties are both owned by the SFLECC. The SFLECC parcel near North Bedford Bay, which is planned to receive dredged sediment for construction of a sediment trap has a seasonally wet wetland on it. The designed sediment disposal is situated on upland soil in this vicinity. The other site is a sand bar which has formed in the past eight years in the Hoagland Bay. It has perennially saturated soils on this site, being formed by sediment deposition form upstream erosion and local bank erosion.

We understand that eight years ago, Hoagland Bay was dredged by a collaboration of local property owners and NIPSCO to construct a sediment trap. This dredging was done with a drag line with the dredged material thrown up on the bank without revetment. Hoagland Ditch has been identified as among the highest sediment contributing tributaries to Lake Shafer. Storm events frequently transport dead trees and snags down the Hoagland Ditch which become lodged near the mouth of Hoagland Bay.

According to local accounts, soon after dredging, a storm event placed a relatively large tree in the newly dredged sediment trap. This tree formed a current break and sediment rapidly accumulated around it, both from upstream sources and from the unretained dredge spoil being redeposited back into the Bay via natural erosive forces. Soon a sand bar/island developed in the location of the tree.

By the application of the Level 3 method, from the 1987 Corps of Engineers Wetland Identification Manual (Manual), a line around wetlands was established in both of these project sites. The approximate locations of the wetlands are shown on Exhibits 1a, 1b, and 1c. These approximate boundaries have been located on the map using steps 17, 18, and 19 for on-site inspections from the Manual. The approximate locations were drawn in on the project plans. The following report summarizes our investigation.

One other proposed sediment disposal site presently has existing wetlands on the site. However, it is not a jurisdictional wetland. The property is owned by Art Segal who obtained COE permit number 199101048 to fill the site. Mitigation was performed by Mr. Segal by constructing an eight (8) acre wetland as replacement.

LOCATION

Both wetland areas are found on the U.S.G.S. Monticello North Quadrangle map. The SFLECC owned ground designated as a sediment disposal site for the North Bedford Bay sediment trap is found along the west side of County Road 300 East, adjacent to where the road crosses Big Monon Creek immediately upstream of North Bedford Bay. It is located in Range 4 West, Township 28 North, in the southeast 1/4 of Sections 24 and the northeast 1/4 of Section 25.

The Hoagland Bay sediment trap site is located in Hoagland Bay, along West Shafer Drive, in Range 3 West, Township 27 North, in the extreme southeast corner of Section 6.

GENERAL SITE CHARACTERISTICS

The proposed sediment disposal site for the North Bedford Bay sediment trap is presently a pasture grazed by cattle. It has a variety of native and non-native herbaceous prairie grasses and weeds growing on the site. The wetlands are in the south end of this site. This is relatively flat to gently rolling topography with 1-3% slopes in the area.

The Hoagland Bay sediment trap site is characterized by heavy sedimentation from upstream sources. The proposed project site has filled in from a depth of from approximately 8 to 10 feet in 1987 to less than two feet over the entire bay presently, with most of the Bay having water less than one (1) deep. The substrate is primarily sand with some silt deposition in the lower current energy areas. As described earlier, the wetland area within Hoagland Bay is basically a sand bar that has grown from accumulated sand and silt over the past eight years.

In the opinion of Commonwealth Engineers, Inc. (CEI) environmental science staff, the habitat value of the North Bedford Bay wetland is considered relatively low given the fact that the majority of the area is marginally wet, and water is never ponded in area. In addition, the area is well trampled by grazing cattle.

Also in the opinion of CEI environmental science staff, the Hoagland Bay area is of good to marginal wildlife habitat. This opinion is based on numerous observations of wildlife use (or non-use), and the location of the wetland. While being located in a larger aquatic system (i.e., Lake Shafer), the sand bar wetland is surrounded by residential development around Hoagland Bay. Also the site is very small (approximately .16 acres) which further limits the use of the sand bar by wildlife.

NATIONAL WETLANDS INVENTORY

North Bedford Bay

The National Wetlands Inventory (NWI) for the Monticello North, IN Quadrangle (1989), indicates that a PEMC wetland may be present at the subject site.

PEMC = Palustrine, Emergent, Seasonally Flooded.

The NWI serves only as a large scale guide, however, and the actual wetland boundaries, and wetland types, often vary. In this case, the above mentioned wetland was present at the time of the field reconnaissance, albeit with a boundary different from that depicted on the NWI map.

Hoagland Bay

The National Wetland Inventory (NWI) for the Monticello North, IN Quadrangle (1989), does not show the sand bar in question because it did not exist when the map was made. However, the bed of lake Shafer is classified as LUBHh.

LUBHh = Lacustrine, Unconsolidated Bottom, Perennially Flooded, Diked/Impounded

WETLAND DELINEATION

On September 15, Commonwealth Engineers, Inc. (CEI) staff performed a wetlands field investigation of the subject sites. The wetland boundaries were determined in accordance with the methodology established by the U. S. Army Corps of Engineers (COE) 1987 Wetland Delineation Manual. The approximate limits of the wetlands were located on the map in Exhibits 1b and 1c. The aforementioned exhibits and information were used to assist in the delineation.

The January 1987 Corps of Engineers Wetlands Delineation Manual, identifies the mandatory technical criteria for wetland identification. The three essential characteristics of a jurisdictional wetland are hydrophytic vegetation, hydric soils and wetland hydrology.

The hydrophytic vegetation criterion is based on a separation of plants into four basic groups:

(1) obligate wetland plants (OBL) that occur almost always (estimated probability >99%) in wetlands under natural conditions;

(2) facultative wetland plants (FACW) that usually occur in wetlands (estimated probability 67-99%), but occasionally are found in nonwetlands;

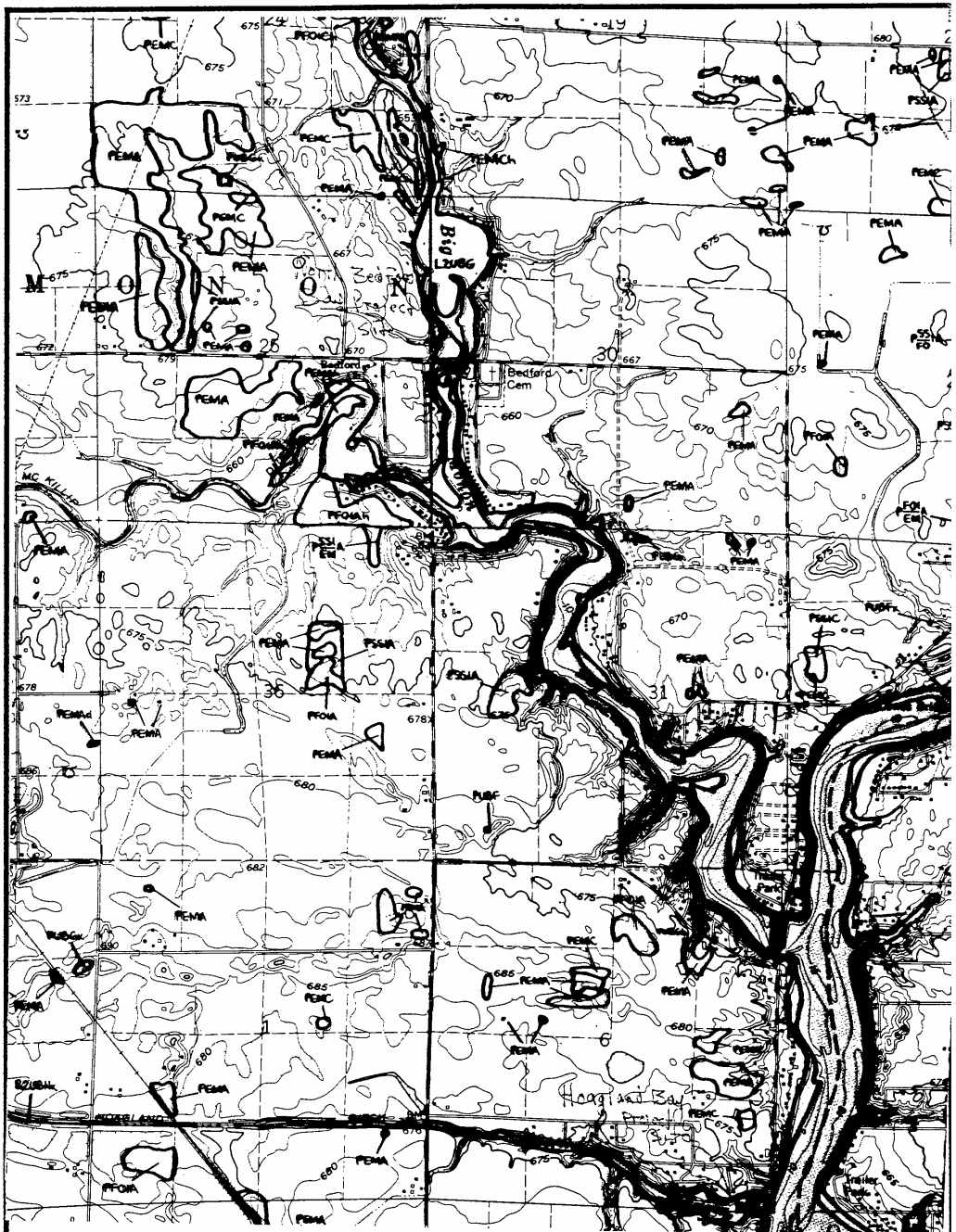
(3) facultative plants (FAC) that are equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%); and

(4) facultative upland plants (FACU) that usually occur in nonwetlands (estimated probability 67-99%), but are occasionally found in wetlands (estimated probability 1-33%).

If a species occurs almost always (estimated probability >99%) in nonwetlands under natural conditions, it is considered an obligate upland plant (UPL). If greater than 50% of the plants present are FAC, FACW, or OBL the subject area is considered jurisdictional in terms of vegetation.

Hydric soils are defined in the manual as "soils that are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part". Field indicators include color, mottling, gleying, odor, wetness, and the predominance of hydrophytic vegetation present in the soil.

The wetland hydrology criterion is often the most difficult to determine. Typically, the presence of water for a week or more during the growing season creates anaerobic conditions in the soil. Anaerobic conditions lead to the prevalence of wetland plants, and indicative soil characteristics. Morphological adaptations of plants, driftlines, and water marks are examples of wetland hydrology field indicators. Occasionally recorded data is available on the hydrologic regime of specific wetlands and riverine systems.



COMMONWEALTH ENGINEERS, INC.

National Wetland Inventory Map
Monon, N.E. Quadrangle

Exhibit 1.a

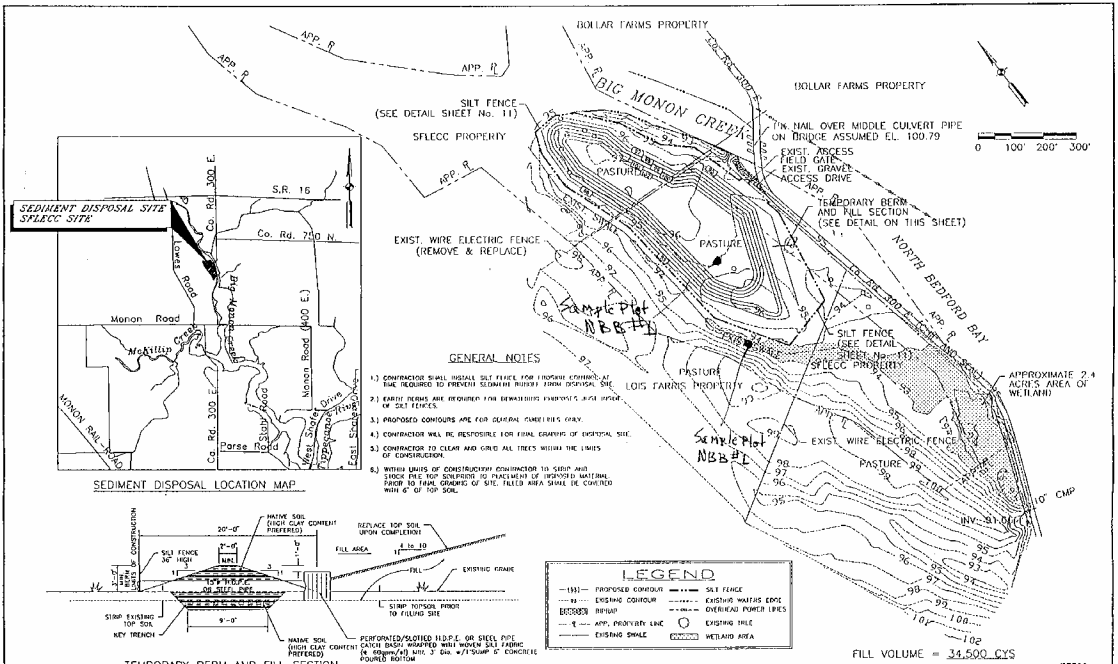


Exhibit 16

COMMONWEALTH ENGINEERS, INC.

DRAWN BY:	DWS
APPROVED BY:	JWM
CHECKED BY:	
DATE:	JUNE, 1995
JOB NO.:	C9536A
SCALE:	1"=100'

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS

SEDIMENT DISPOSAL SITE

SEDIMENT DISPOSAL SITE
SFLECC PROPERTY

DRAWING NO. 9

9 OF 11

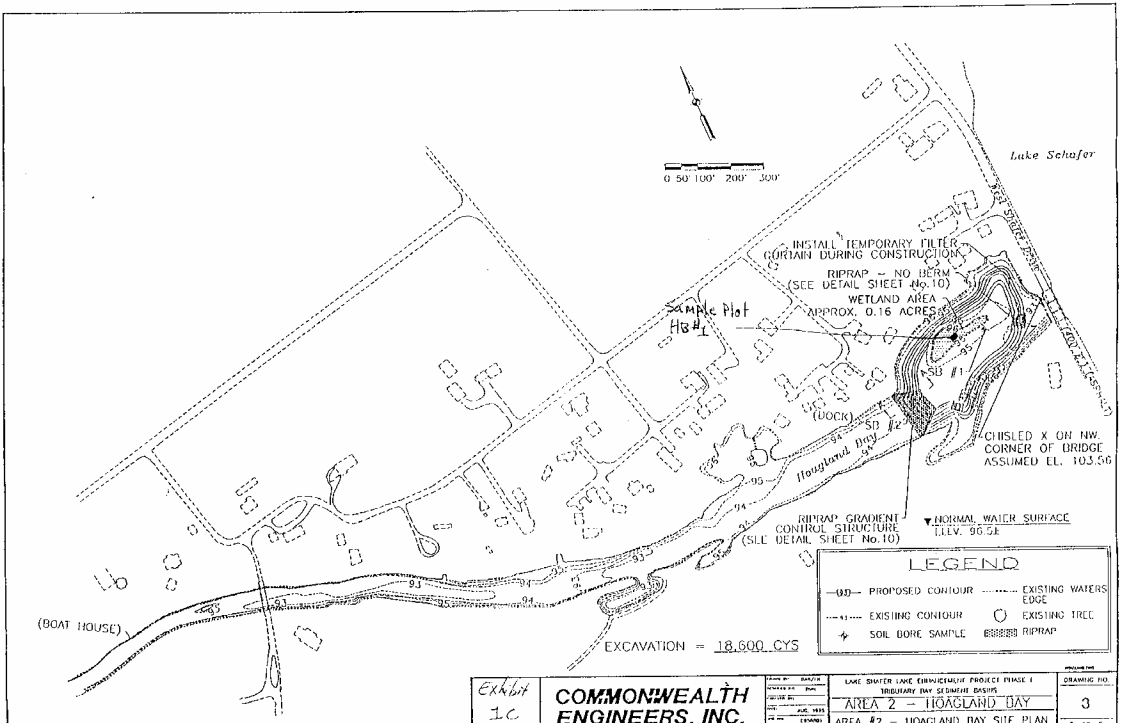


Exhibit 1C

COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER-LAKE CHRISTENSEN PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
AREA #2 - HOAGLAND BAY SITE PLAN

DRAWING NO. 3
3 OF 6

SOILS

The 1977 White County Soil Survey (Sheet No. 9, and No. 15), as shown in Exhibits 2a and 2b, was consulted to help determine the presence of hydric soils on the site. Mapped hydric soils are often indicative of wetland conditions. The soil mapping units indicated, by the 1977 soil survey, to be present at the site include:

North Bedford Bay Area White County Soil Survey Sheet No. 9

Ck	=	Cohactah	- Fine Sandy Loam Occassionally Flooded -	Hydric
OwA	=	Owosso	- Fine Sandy Loam 1 - 3% slopes -	Upland

The Ck soils are characterized by being deep, very poorly drained, nearly level, of fine sandy texture, extremely dark to black in color for the upper layers and very dark gray in lower part. The Cohactah soil is prone to occasional flooding in January and December. The high water table is from 0 to 1' below the soil surface, between September and May. In the summer months, as is presently the case, the groundwater table is well below the surface (>2'). Cohactah soils are listed in the Hydric Soils of the United States compiled by the USDA.

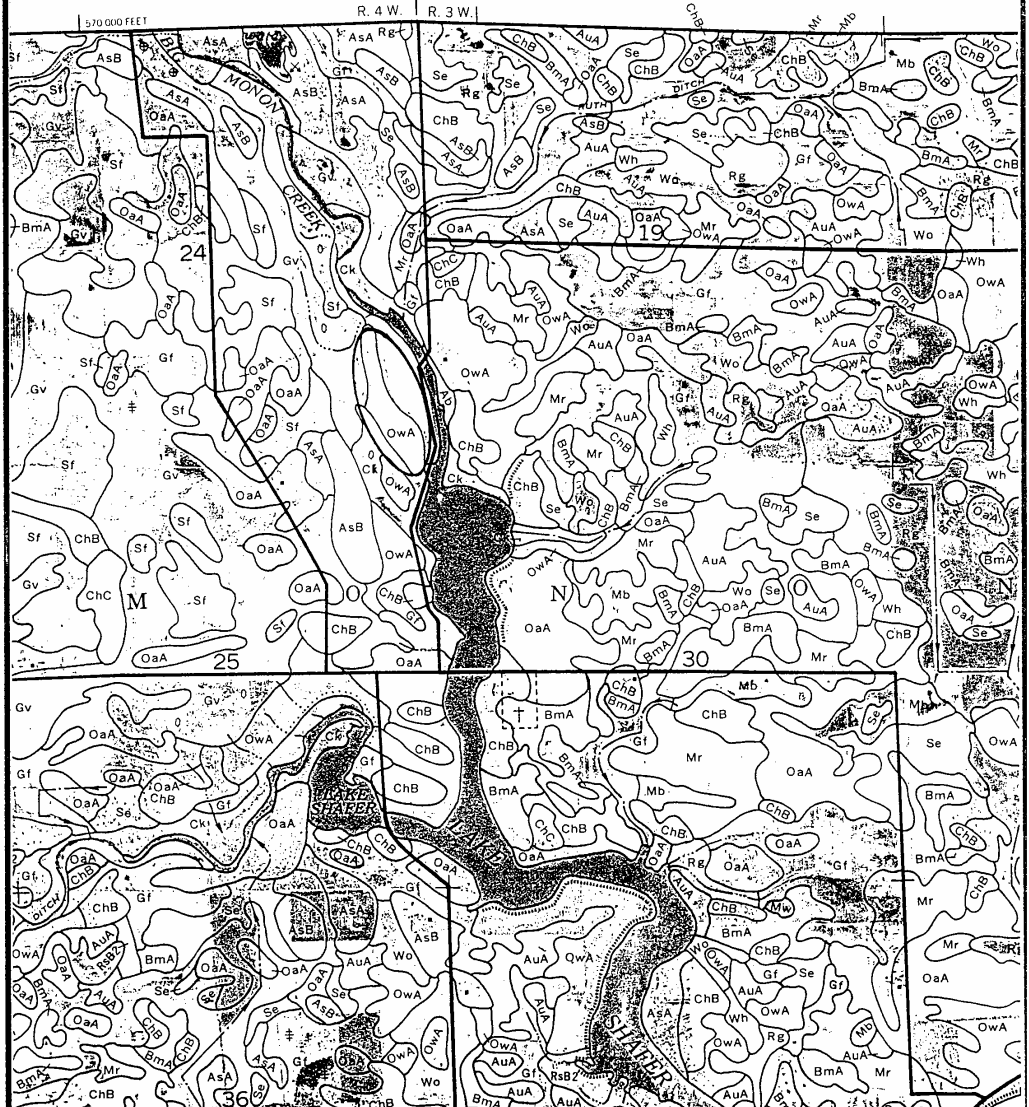
The OwA soil series is a deep, well drained, moderately permeable, dark grayish brown upland soil. Owosso soils are never flooded (according to the White County Soil Survey), and the high ground water table is greater than 6 inches below the surface throughout the year. The proposed sediment disposal site for North Bedford Bay is planned to be placed entirely on upland soils.

Hoagland Bay Area Soil Survey Sheet No. 15

The sand bar in Hoagland Bay did not exist when the 1977 White County Soil Survey was published. The area is shown to be open lake.

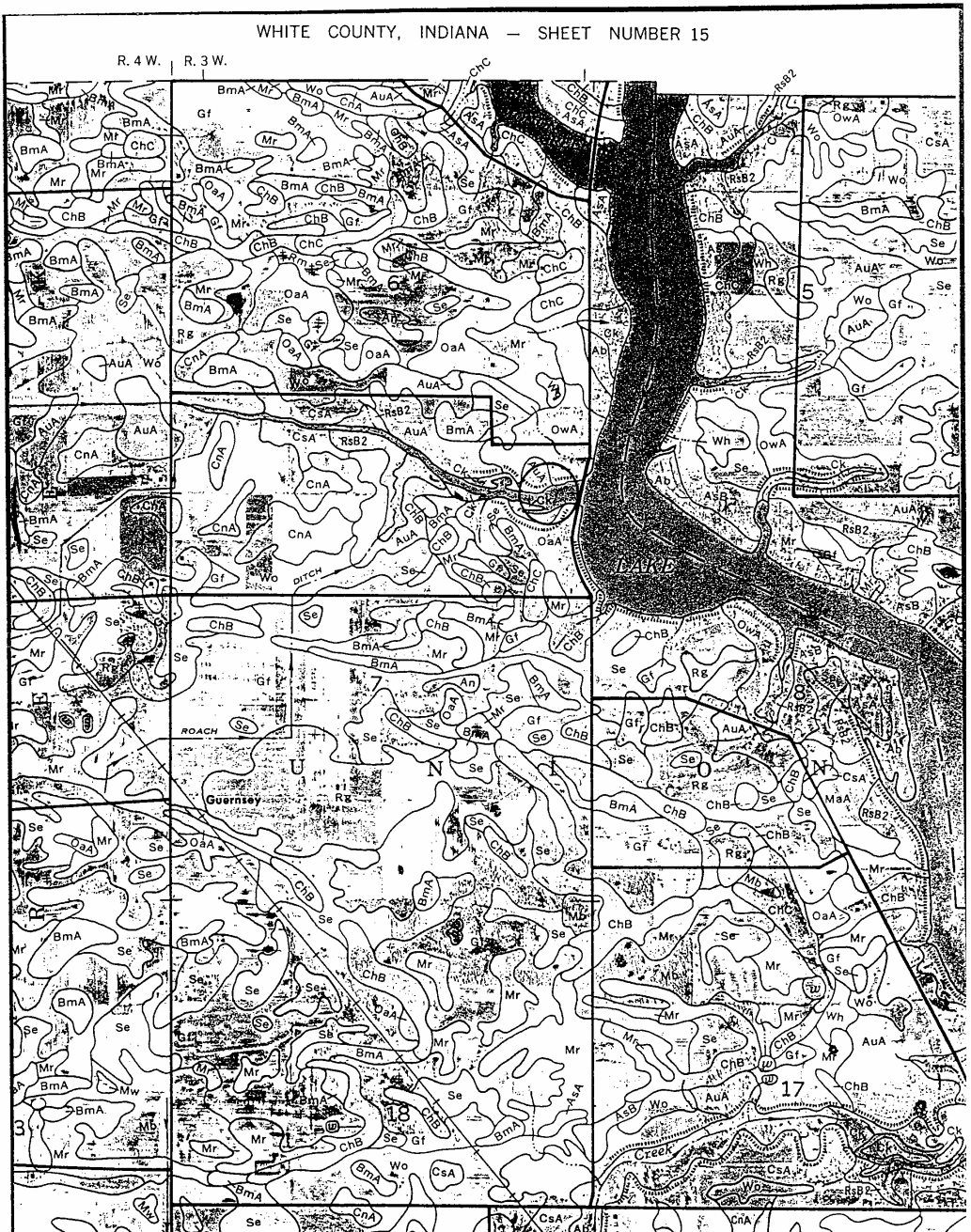
In the field reconnaissance we did not attempt to confirm the soil types marginal to the wetlands or in the upland areas. It was assumed that the soil survey was reasonably accurate therefore, the soil series listed in the soil survey were listed on the field data sheets.

WHITE COUNTY, INDIANA – SHEET NUMBER 9



COMMONWEALTH ENGINEERS, INC.

EXHIBIT 2A
SHEET NUMBER 9 FROM
1977 WHITE COUNTY SOIL SURVEY



COMMONWEALTH ENGINEERS INC

EXHIBIT 2B
SHEET NUMBER 15 FROM
1977 WHITE COUNTY SOIL SURVEY

HYDROPHYTIC VEGETATION

North Bedford Bay Area

As the field investigation data sheets (Exhibit 3) indicate, the NBB #1 sample plot was composed of primarily FACW herbaceous species. This site met the hydrophytic vegetation criteria.

The NBB #2 sample plot was dominated by FACU herbaceous species. It does not meet the hydrophytic vegetation criteria.

Hoagland Bay Area

The Hoagland Bay HB #1 sample plot was dominated by a hydrophytic herbaceous community.

WETLAND HYDROLOGY

For an area to possess wetland hydrology, the soil must be inundated or saturated to the surface at some time during the growing season. Evidence of wetland hydrology includes areas where the presence of water has an overriding influence on the vegetation and soil characteristics due to anaerobic and reducing conditions, respectively.

North Bedford Bay Site

The NBB #1 sample plot was in a low swale which exhibited marginal wetland hydrology indicators.

The NBB #2 sample plot showed no indication of wetland hydrology.

Hoagland Bay Site

The Hoagland Bay HB #1 sample plot was located on the sand bar which is all within the ordinary high water elevation of Lake Shafer. It meets the wetland hydrology criteria.

AREA OF AQUATIC RESOURCE IMPACTED BY PROJECT

Wetland Area Planned for Disturbance

To quantify the acreage of wetland impacted in each project area the wetland was scaled from the site plan drawing with the wetland boundaries super-imposed on the map (Exhibits 1b and 1c).

Site Location	**Number of Acres Impacted**
North Bedford Bay Disposal Site	0.00 acres
Hoagland Bay Sediment Tap Site	0.16 acres
Total Acres of Wetland Impacted by Project	**0.16 acres**

The wetland of the Hoagland Bay is to be replaced with deeper water habitat.

CONCLUSION

In total approximately 0.16 acres are to be replaced by deeper water habitat in the short term. The proposed sediment trap will undoubtedly create another sand bar in the same location as the existing bar within the next eight years. The cycle of maintenance and redeposition is expected to continue until the watershed upstream of Hoagland Bay and the other tributaries is stabilized.

As always, feel free to call with any questions or comments.

Very Truly Yours,

Steve W. Chafin
Environmental Scientist

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: North Bedford Bay Site No.1	Date: 9/15/95
Applicant/Owner: Commmonwealth Biomonitoring for SFLECC	County: White
Investigator: Steve W. Chafin	State: Indiana
Do Normal Circumstances Exist on the site? (Yes) No	Community ID: Herbaceous
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID:
Is the area a potential Problem Area? Yes (No)	Plot ID: NBB #1
(If needed, explain on reverse)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Poa Compressa	herb	FACU+	9.		
2. Helenium Autumnate	herb	FACW+	10.		
3. Solidago Canadensis	herb	FACU	11.		
4.Aster novae-angliae	herb	FACW	12.		
5.Eupatorium perfolatium	herb	FACW+	13.		
6.Plygonumhydropiper	herb	OBL	14.		
7.Acorus calam	herb	OBL	15.		
8.Xanthium strumarium	herb	FAC	16.		

Percent of Dominant Species that are OBL, FACW OR FAC (excluding FAC-). 75%

Remarks:

Hydrophytes dominate the plant community. However, since the area is heavily grazed and many of the wetland plant species are less palatable (even poisonous) to cattle, the more succulent upland species will likely have been grazed heavily. This may have skewed plant community toward increase dominance by hydrophytes.

HYDROLOGY

____ Recorded Data (Described in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
X No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: >24 (in.)

Depth to Saturated Soil: >24 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
_X_ Drainage Patterns in Wetland
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in upper 12 in.
___ Water-Stained Leaves
_X_ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:
At the time of the field wetland evaluation the soil was extremely dry. The only indication of wetland hydrology is the existence of a low drainage swale through the area.. This area appears to be only marginally wet even durin gwinter months. Sampling site NBB #1 is at the upper end of the drainage swale/wetland area at the North Bedford Bay site.

SOILS

Map Unit Name
(Series and Phase): Cohactah

Drainage Class: very poorly drained

Field Observations
Taxonomy (Subgroup): coarse, loamy, Fluvaquentic Haplaquolls
Confirm Mapped Type? X(Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color Munsell Moist	Mottle Colors Munsell Moist	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-9	Ap	7.5YR 2/0	7.5YR 4/4	mottles sparse, oxidized	Fine Sandy loam
9-16	A12	7.5YR 2/0	7.5YR 4/4	common, distinct	fine, sandy loam
16-24	C1g	7.5YR 2/0	7.5YR 4/4	common, distinct	fine, sandy loam

Hydric Soil Indicators:

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic content in Surface Layer in Sandy Soils
_____ Sulfidic Odor	_____ Organic Streaking in Sandy Soils
_____ Aquic Moisture Regime	X Listed on Local Hydric Soils List
_____ Gleyed or Low-Chroma Colors	_____ Other (Explain in Remarks)

Remarks:
A thin layer of organic material is on the soil surface.

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	(Yes)	No	Is this Sampling Point Within a Wetland?	(Yes)	No
Wetland Hydrology Present?	(Yes)	No			
Hydric Soils Present?	(Yes)	No			

Remarks:

The wetland hydrology criterion appears to be marginal, however, it is the dry season.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: North Bedford Bay Site No.2 Applicant/Owner: Commmonwealth Biomonitoring for SFLECC Investigator: Steve W. Chafin	Date: 9/15/95 County: White State: Indiana
Do Normal Circumstances Exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse)	Community ID: Herbaceous Transect ID: Plot ID: NBB #2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. Lolium perennes	herb	FACU	9.		
2. Ambrosia artemisiifolia	herb	FACU	10.		
3. Solidago canadensis	herb	FACU	11.		
4. Daucus carota	herb	upland	12.		
5. Ipomoea purpurea	herb	FACU-	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW OR FAC (excluding FAC). 0%

Remarks:

Upland plant species

HYDROLOGY

____ Recorded Data (Described in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
__X__ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: >24 (in.)

Depth to Saturated Soil: >24 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetland
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in upper 12 in.
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

No wetland hydrology indicators present

SOILS

Map Unit Name
(Series and Phase): Owosso

Drainage Class: well drained

Taxonomy (Subgroup): Typic Haplufalfs

Field Observations
Confirm Mapped Type? (X)Yes No

Profile Description:

Depth (Inches)	Horizon	Matrix Color Munsell Moist	Mottle Colors Munsell Moist	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-9	Ap	10YR 4/2	N/A	N/A	fine, sandy loam,
9-20	B1-B21	10YR5/4	N/A	N/A	fine sandy lm

Hydric Soil Indicators:

_____ Histosol
_____ Histic Epipedon
_____ Sulfidic Odor
_____ Aquic Moisture Regime
_____ Gleyed or Low-Chroma Colors
_____ Concretions
_____ High Organic content in Surface Layer in Sandy Soils
_____ Organic Streaking in Sandy Soils
_____ Listed on Local Hydric Soils List
_____ Other (Explain in Remarks)

Remarks:

no hydric soil indicators

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	Yes	(No)	Is this Sampling Point Within a Wetland?	Yes	(No)
Wetland Hydrology Present?	Yes	(No)			
Hydric Soils Present?	Yes	(No)			

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Hoagland Bay Site No.1 Applicant/Owner: Commmonwealth Biomonitoring for SFLECC Investigator: Steve W. Chafin	Date: 9/15/95 County: White State: Indiana
Do Normal Circumstances Exist on the site? Yes (No) Is the site significantly disturbed (Atypical Situation)? (Yes) No Is the area a potential Problem Area? (Yes) No (If needed, explain on reverse)	Community ID: Haerbaceous Transect ID: Plot ID: HB #1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1.Leersia oryzoides	herb	OBL	9.		
2.Eleocharis olivacae	herb	OBL	10.		
3.Bidens connata	herb	OBL	11.		
4.Lythrum salicaria	herb	OBL	12.		
5.Rumex orbiculatus	herb	OBL	13.		
6.Sagittaria engelmanniana	herb	OBL	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW OR FAC (excluding FAC). 100%

Remarks:

All hydrophytic plants dominate the community

HYDROLOGY

____ Recorded Data (Described in Remarks):
___X_ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: <6 (in.)

Depth to Saturated Soil: 2 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
_X_ Saturated in upper 12 inches
___ Water Marks
_X_ Drift Lines
_X_ Sediment Deposits
___ Drainage Patterns in Wetland
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in upper 12 in.
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Page 34 of 1987 COE manual cautionary statement reads: "In recently deposited sandy material (sand bars), it may be impossible to find any of these (wetland) indicators. In such cases, consider this as a natural atypical situation.

SOILS

Map Unit Name
(Series and Phase): not applicable, this is a new sand bar

Drainage Class: _____

Taxonomy (Subgroup): _____

Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (Inches)	Horizon	Matrix Color Munsell Moist	Mottle Colors Munsell Moist	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-10	N/A	5Y 3/1	N/A	N/A	Silty sand

Hydric Soil Indicators:

_____	Histosol	_____	Concretions
_____	Histic Epipedon	X	High Organic content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Gleyed or Low-Chroma Colors	X	Other (Explain in Remarks)

Remarks:

The sand bar is saturated nearly to the surface

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	(Yes)	No	Is this Sampling Point Within a Wetland?	(Yes)	No
Wetland Hydrology Present?	(Yes)	No			
Hydric Soils Present?	(Yes)	No			

Remarks:

According to local accounts, this sand bar has developed over the past eight years, since the last time a sedimentation basin was dredged in the place of th existing sand bar.

APPENDIX "B"

QUANTITY AND COST ESTIMATES

LAKE SHAFER LAKE ENHANCEMENT PROJECT

PRELIMINARY CONSTRUCTION COST ESTIMATE
COMMONWEALTH ENGINEERS, INC.
UPDATED: JUNE 12, 1996

*Dredest1.wk4

Location: Little Monon Bay at McKillip Ditch

NO.	ITEM	QUANTITY	UNITS	UNIT PRICE	TOTALS
1	Mobilization, Bond, etc. (3%)	1	LS	$5,486.10	$5,486.10
2a	Lake Excavation - Cell #1	6,900	CYS	$4.00	$27,600.00
2b	Lake Excavation - Cell #2	9,300	CYS	$4.00	$37,200.00
2c	Lake Excavation - Cell #3	13,600	CYS	$4.00	$54,400.00
3	Riprap, Hand Laid, 12 In.	520	CYS	$60.00	$31,200.00
4	Filter Fabric	890	SYS	$3.00	$2,670.00
5	Disposal Site O & M	29,800	CYS	$1.00	$29,800.00
6					
7	SUBTOTAL				$188,356.10
8	15% CONTINGENCIES				$28,253.42
9	TOTAL				$216,609.52

shafest3.wk4

Location: Hoagland Bay

NO.	ITEM	QUANTITY	UNITS	UNIT PRICE	TOTALS
1	Mobilization, Bond, etc. (3%)	1	LS	$4,681.80	$4,681.80
2	Lake Excavation	18,600	CYS	$4.00	$74,400.00
3	Riprap, Hand Laid, 12 In.	970	CYS	$60.00	$58,200.00
4	Filter Fabric	1,620	SYS	$3.00	$4,860.00
5	Disposal Site O & M	18,600	CYS	$1.00	$18,600.00
6					
7	SUBTOTAL				$160,741.80
8	15% CONTINGENCIES				$24,111.27
9	TOTAL				$184,853.07

LAKE SHAFER LAKE ENHANCEMENT PROJECT

PRELIMINARY CONSTRUCTION COST ESTIMATE
COMMONWEALTH ENGINEERS, INC.
UPDATED: JUNE 12, 1996
*Dredest1.wk4

shafest4.wk4
Location: Honey Creek Bay

NO.	ITEM	QUANTITY	UNITS	UNIT PRICE	TOTALS
1	Mobilization, Bond, etc. (3%)	1	LS	$2,112.90	$2,112.90
2	Lake Excavation	11,200	CYS	$4.00	$44,800.00
3	Riprap, Hand Laid, 12 In.	222	CYS	$60.00	$13,320.00
4	Filter Fabric	370	SYS	$3.00	$1,110.00
5	Disposal Site O & M	11,200	CYS	$1.00	$11,200.00
6					
7	SUBTOTAL				$72,542.90
8	15% CONTINGENCIES				$10,881.44
9	TOTAL				$83,424.34

shafest5.wk4
Location: Keans Bay

NO.	ITEM	QUANTITY	UNITS	UNIT PRICE	TOTALS
1	Mobilization, Bond, etc. (3%)	1	LS	$4,837.08	$4,837.08
2	Lake Excavation	23,600	CYS	$4.00	$94,400.00
3	Riprap, Hand Laid, 12 In.	590	CYS	$60.00	$35,400.00
4	Filter Fabric	1,100	SYS	$3.00	$3,300.00
5	0.1345" Steel Sheet Piling	252	SF	$18.00	$4,536.00
6	Disposal Site O & M	23,600	CYS	$1.00	$23,600.00
7					
8	SUBTOTAL				$166,073.08
9	15% CONTINGENCIES				$24,910.96
10	TOTAL				$190,984.04

shafest6.wk4
Location: North Bedford Bay

NO.	ITEM	QUANTITY	UNITS	UNIT PRICE	TOTALS
1	Mobilization, Bond, etc. (3%)	1	LS	$19,537.50	$19,537.50
2a	Lake Excavation - Cell #1	57,800	CYS	$4.00	$231,200.00
2b	Lake Excavation - Cell #2	38,500	CYS	$4.00	$154,000.00
2c	Lake Excavation - Cell #3	26,000	CYS	$4.00	$104,000.00
3	Riprap, Hand Laid, 12 In.	610	CYS	$60.00	$36,600.00
4	Filter Fabric	1,050	SYS	$3.00	$3,150.00
5	Disposal Site O & M	122,300	CYS	$1.00	$122,300.00
6					
7	SUBTOTAL				$670,787.50
8	15% CONTINGENCIES				$100,618.13
9	TOTAL				$771,405.63

TOTAL ALL PROJECTS	$1,447,276.59

Lake Shafer Enhancement Project
Project Quantities

12/12/95

Quant01.wk4

No.	Location	Cut (cys)	Fill (cys)
	Trap Sites		
1	Honey Creek Bay	11,200	
2	Hoagland Bay	18,600	
3	Little Monon Bay at McKillip Ditch	34,270	
4	North Bedford Bay	140,645	
5	Keans Bay	23,600	
	Total	228,315	
	Disposal Sites		
1	Honey Creek Bay Peninsula		8,000
2	Indiana Beach Property (Honey Creek)		25,250
3	Segal Property		78,200
4	Peter's Property (Keans's Bay)		9,330
5	SFLECC Property		34,500
6	Pineview Golf Gourse Property		90,000
7	CR 225 N at Honey Creek		22,000
	Total		267,280

APPENDIX "C"

WATER QUALITY DATA

SUSPENDED SOLIDS ANALYTICAL DATA SUMMARY

Sample Site	Date	Results (mg/l)
A.		
McKellip Ditch @ C.R. 175E	6/1/95	104
Hoagland Ditch @ C.R. 300E	6/1/95	72
Timmons Ditch @ N. Shafer Dr.	6/1/95	64
Big Monon Creek @ S.R. 16	6/1/95	24
B.		
Big Monon Ditch	12/7/94	436
Hoagland Bay	12/7/94	256
Honey Creek Bay	12/7/94	184
Tippecanoe River	12/7/94	69
Carnahan Ditch	12/7/94	31
Keans Bay	12/7/94	30
Lake Shafer @ Long's Bridge	12/7/94	21
Big Monon Bay	12/7/94	19

The sampling dates were each after a major rain event, so the data cannot be directed compared between sampling occasions.

However, the samples taken withing the respective occasions can be compared to one another. Within sample occasion A, the first site falls into a relatively high category of suspended solids, the second two sites into a medium grade of suspended solids, and the last one into a low grade of suspended solids. Within sample occasion B, the first three sampling sites represent a relatively high amount of suspended solids, the second one (Tippecanoe) a medium amount, and the last four fall into the relatively low amount grade of suspended solids.

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Steve Chafin
COMMONWEALTH ENGINEERS
7256 Company Drive
Indianapolis, IN 46237

06/08/1995

P.O. NO.: VERBAL - asked Rmk 3 P.O.# → not needed
Job No.: 95.02035
Page 1

Date Received: 06/05/1995
Job Description: LAKE SHAFER SEDIMENT CONTROL

Sample Number / Sample I.D. / Parameters	Results	Flag	Sample Date/ Units	Analyst & Date Analyzed	Method	Method PQL
108219 LAKE SHAFER #1 (C.R. Hoagland Ditch @ 390E)			06/01/1995			
Solids, Suspended	72		mg/L	plk / 06/06/1995	E-160.2	<5.
108220 LAKE SHAFER #2 (McKillip ditch @ C.R. 175E)			06/01/1995			
Solids, Suspended	104		mg/L	plk / 06/06/1995	E-160.2	<5.
108221 LAKE SHAFER #3 (Big Mouse Crk. @ 46Rd. 16)			06/01/1995			
Solids, Suspended	24		mg/L	plk / 06/06/1995	E-160.2	<5.
108222 LAKE SHAFER #4 (Timmons Ditch @ N. Shafer Drive)			06/01/1995			
Solids, Suspended	64		mg/L	plk / 06/06/1995	E-160.2	<5.

6,415 CFS Discharge on 5/26
as per Bob Coates, NIPSCO

Project Manager

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Steve Chafin
COMMONWEALTH ENGINEERS
7256 Company Drive
Indianapolis, IN 46237

06/08/1995

P.O. NO.: VERBAL - asked Rmk 2 P.O.# => not needed
Job No.: 95.02035
Page 1

Date Received: 06/05/1995
Job Description: LAKE SHAFER SEDIMENT CONTROL

Sample Number / Sample I.D. Parameters	Results	Flag	Sample Date/ Units	Analyst & Date Analyzed	Method	Method PQL
108219 LAKE SHAFER #1 Hoagland/Ith @ C.R. 300E			06/01/1995			
Solids, Suspended	72		mg/L	plk / 06/06/1995	E-160.2	<5.
108220 LAKE SHAFER #2 McKillip ditch @ C.R. 175E			06/01/1995			
Solids, Suspended	104		mg/L	plk / 06/06/1995	E-160.2	<5.
108221 LAKE SHAFER #3 Big Mouse Crk. @ St Rd. 16			06/01/1995			
Solids, Suspended	24		mg/L	plk / 06/06/1995	E-160.2	<5.
108222 LAKE SHAFER #4 Timmons Ditch @ N. Shafer Drive			06/01/1995			
Solids, Suspended	64		mg/L	plk / 06/06/1995	E-160.2	<5.

6,418 CFS Discharge on 5/26
as per Bob Coates, NIPSCO

Beth Day
Project Manager

OCEAN GROUP

NET NATIONAL ENVIRONMENTAL TESTING, INC.

CHAIN OF CUSTODY RECORD

COMPANY Commonwealth Engineers
ADDRESS
PHONE FAX
PROJECT NAME/LOCATION
PROJECT NUMBER
PROJECT MANAGER

REPORT TO: Steve Chafin
INVOICE TO:
P.O. NO.
NET QUOTE NO.

SAMPLED BY

(PRINT NAME) SIGNATURE
(PRINT NAME) SIGNATURE

DATE	TIME	SAMPLE ID/DESCRIPTION	MATRIX	GRAB	COMP	# and Type of Containers: HCl	NaOH	HNO_3	H_2SO_4	OTHER	ANALYSES: TSS
5/24		Lake Shafer #1									
5/26		" 2									
↓		" 3									
↓		" 4									

To assist us in selecting the proper method

Is this work being conducted for regulatory compliance monitoring? Yes ____ No ____

Is this work being conducted for regulatory enforcement action? Yes ____ No ____

Which regulations apply: RCRA ____ NPDES Wastewater ____
UST ____ Drinking Water ____
Other ____ None ____

COMMENTS

CONDITION OF SAMPLE: BOTTLES INTACT? YES / NO
FIELD FILTERED? YES / NO
COC SEALS PRESENT AND INTACT? YES / NO
VOLATILES FREE OF HEADSPACE? YES / NO
TEMPERATURE UPON RECEIPT: ____
Bottles supplied by NET? YES / NO

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA ____
I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS ____ DATE ____

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RELINQUISHED BY:	DATE	TIME	RECEIVED FOR NET BY:
[signature]	6/4/95	4:00P					M. Mathism

METHOD OF SHIPMENT

REMARKS:

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OWM-BIOLOGICAL STUDIES
SEDIMENT CONTAMINATION RESULTS
IDEM SAMPLE NUMBER:

LAB NUMBER:DD2945 SITE:LAKE SHAFER COUNTY:WHITE |SEDIMENT
COLLECTION DATE:20-Aug-1986 LOCATION:U/S BIG MONON CR CONFLUENCE LAB:ISDH |PREPARATION:COMPOSITE OF 3 GRABS

GENERAL PARAMETERS

% TOTAL SOLIDS		45.00
% MOISTURE		55.00
% VOLATILE SOLIDS		9.00
NH3-N (mg/kg)		NA
A.V.S. (mg/kg)		NA
T.O.C.(%)		NA
CYANIDE	<	0.125

(MG/KG wet weight)

METALS (dry weight)		(MG/KG)	(MAX)
ALUMINUM		NA	
ANTIMONY	<	0.230	
ARSENIC		11.000	(22)41
BARIUM		NA	
BERYLLIUM	<	2.300	
CADMIUM	<	2.300	
CALCIUM		NA	
CHROMIUM		16.000	1200
COBALT		NA	
COPPER		19.000	1500
IRON		NA	
LEAD		16.000	300
MAGNESIUM		NA	
MANGANESE		NA	
MERCURY		0.047	17
NICKEL		8.100	420
POTASSIUM		NA	
SELENIUM		0.470	36
SILVER	<	2.600	
SODIUM		NA	
THALLIUM	<	23.000	
VANADIUM		NA	
ZINC		77.000	2800

PESTICIDES		(MG/KG)
ALDRIN	<	0.003
alpha-BHC		0.009
beta-BHC	<	0.003
delta-BHC	<	0.002
gamma-BHC	<	0.0001
alpha-CHLORDANE		NA
gamma-CHLORDANE		NA
cis-NONACHLOR		NA
trans-NONACHLOR		NA
OXYCHLORDANE		NA
TOTAL CHLORDANE	<	0.010
p,p'-DDD	<	0.002
o,p'-DDD		NA
p,p'-DDE	<	0.002
o,p'-DDE		NA
p,p'-DDT	<	0.002
o,p'-DDT		NA
DIELDRIN	<	0.006
ENDOSULFAN I	<	0.004
ENDOSULFAN II	<	0.010
ENDOSULFAN SULFATE	<	0.020
ENDRIN	<	0.008
ENDRIN ALDEHYDE		NA
ENDRIN KETONE		NA
HEPTACHLOR	<	0.002
HEPTACHLOR EPOXIDE	<	0.002
HEXACHLOROBENZENE		NA
METHOXYCHLOR	<	0.020
PENTACHLOROANISOLE		NA
TOXAPHENE	<	0.200

BASE/NEUTRAL EXTRACTABLE COMPOUNDS	(MG/KG)
ACENAPHTHYLENE	NA
ACENAPHTHENE	NA
ANILINE	NA
4-CHLOROANILINE	NA
2-NITROANILINE	NA
3-NITROANILINE	NA
4-NITROANILINE	NA
ANTHRACENE	NA
BENZO(a)ANTHRACENE	NA
DIBENZO(a,h)ANTHRACENE	NA
3,3'-DICHLOROBENZIDINE	NA
1,2-DICHLOROBENZENE	NA
1,3-DICHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
1,2,4-TRICHLORBENZENE	NA
HEXACHLOROBENZENE	NA
NITROBENZENE	NA
BENZYL ALCOHOL	NA
CARBAZOLE	NA
CHRYSENE	NA
n-NITROSODIPHENYLAMINE	NA
n-NITROSO-di-n-PROPYLAMINE	NA
HEXACHLOROETHANE	NA
BIS(2-CHLOROETHYL)ETHER	NA
BIS(2-CHLOROISOPROPYL)ETHER	NA
4-BROMOPHENYL-PHENYLETHER	NA
4-CHLOROPHENYL-PHENYLETHER	NA
FLUORANTHENE	NA
FLUORENE	NA
BENZO(beta)FLUORANTHENE	NA
BENZO(kappa)FLUORANTHENE	NA
DIBENZOFURAN	NA
BIS(2-CHLOROETHOXY)METHANE	NA
ISOPHORONE	NA
NAPHTHALENE	NA
2-CHLORONAPHTHALENE	NA
2-METHYLNAPHTHALENE	NA
HEXACHLOROCYCLOPENTADIENE	NA
BENZO(ghi)PERYLENE	NA
PHENANTHRENE	NA
di-n-BUTYLPHTHALATE	NA
DIETHYLPHTHALATE	NA
DIMETHYLPHTHALATE	NA
di-n-OCTYLPHTHALATE	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA
BUTYLBENZYLPHTHALATE	NA
PYRENE	NA
BENZO(alpha)PYRENE	NA
INDENO(1,2,3-c,d)PYRENE	NA
2,4-DINITROTOLUENE	NA
2,6-DINITROTOLUENE	NA
HEXACHLOROBUTADIENE	NA
1,2-DIPHENYLHYDRAZINE	NA

ACID EXTRACTABLE COMPOUNDS	(MG/KG)
BENZOIC ACID	NA
PHENOL	NA
2-CHLOROPHENOL	NA
2,4-DICHLOROPHENOL	NA
2,4,5-TRICHLOROPHENOL	NA
2,4,6-TRICHLOROPHENOL	NA
PENTACHLOROPHENOL	NA
2-METHYLPHENOL	NA
4-METHYLPHENOL	NA
2,4-DIMETHYLPHENOL	NA
4-CHLORO-3-METHYLPHENOL	NA
4,6-DINITRO-2-METHYLPHENOL	NA
2-NITROPHENOL	NA
4-NITROPHENOL	NA
2,4-DINITROPHENOL	NA

PCBs	(MG/KG)
AROCLOR-1016 <	0.010
AROCLOR-1221 <	0.010
AROCLOR-1232 <	0.010
AROCLOR-1242 <	0.010
AROCLOR-1248 <	0.010
AROCLOR-1254 <	0.020
AROCLOR-1260 <	0.020
AROCLOR-1262	NA
TOTAL PCB	NA

FUEL OIL	NA
GASOLINE	NA
ACETONE	NA
BENZENE	NA
CHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
ETHYLBENZENE	NA
2-BUTANONE (MEK)	NA
CARBON DISULFIDE	NA
CHLOROETHANE	NA
1,1-DICHLOROETHANE	NA
1,2-DICHLOROETHANE	NA
1,1,1-TRICHLOROETHANE	NA
1,1,2-TRICHLOROETHANE	NA
1,1,2,2-TETRACHLOROETHANE	NA
2-CHLOROETHYLVINYLETHER	NA

VOLATILE ORGANIC COMPOUNDS	(MG/KG)
1,1-DICHLOROETHYLENE	NA
1,2-DICHLOROETHYLENE	NA
TRICHLOROETHYLENE (TOTAL)	NA
TETRACHLOROETHYLENE	NA
2-HEXANONE	NA
BROMOMETHANE	NA
TRIBROMOMETHANE (BROMOFORM)	NA
BROMODICHLOROMETHANE	NA
DIBROMOCHLOROMETHANE	NA
TRICHLOROFLUOROMETHANE	NA
CHLOROMETHANE	NA
DICHLOROMETHANE (METHYLENE CHLORIDE)	NA
TRICHLOROMETHANE (CHLOROFORM)	NA
TETRACHLOROMETHANE (CARBON TETRACHLORIDE)	NA
4-METHYL-2-PENTANONE	NA
1,2-DICHLOROPROPANE	NA
c-1,3-DICHLOROPROPYLENE	NA
t-1,3-DICHLOROPROPYLENE	NA
STYRENE	NA
TOLUENE	NA
VINYL ACETATE	NA
VINYL CHLORIDE	NA
TOTAL XYLENE	NA

PRINT DATE: 12-May-1996

PESTICIDES, PCBs, BASE NEUTRAL, ACID EXTRACTABLE AND VOLATILE ORGANIC COMPOUNDS ARE REPORTED ON A WET WEIGHT BASIS.
NA=NOT ANALYZED ND=NONE DETECTED D=DUPLICATE ISDH= INDIANA STATE DEPARTMENT OF HEALTH
T.O.C.=TOTAL ORGANIC CARBON A.V.S.= ACID VOLATILE SULFIDES
OTHER FLAGS ARE EXPLAINED ON A SEPARATE SHEET

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OWM-BIOLOGICAL STUDIES
SEDIMENT CONTAMINATION RESULTS
IDEM SAMPLE NUMBER:

LAB NUMBER:SD3944 SITE:LAKE SHAFER COUNTY:WHITE :SEDIMENT
COLLECTION DATE:20-Aug-1996 LOCATION:BIG MONON CREEK BASIN LAB:ISDH :PREPARATION:COMPOSITE FIELD DUP.

GENERAL PARAMETERS

% TOTAL SOLIDS		48.00
% MOISTURE		52.00
% VOLATILE SOLIDS		7.00
NH3-N (mg/kg)		NA
A.V.S. (mg/kg)		NA
T.O.C.(%)		NA
CYANIDE	<	0.125

(MG/KG wet weight)

METALS(dry weight)		(MG/KG)
ALUMINUM		NA
ANTIMONY	<	0.230
ARSENIC		4.800
BARIUM		NA
BERYLLIUM	<	2.300
CADMIUM	<	2.300
[illegible]CIUM		NA
[illegible]MIUM		8.900
[illegible]T		NA
[illegible]ER		17.000
IRON		NA
LEAD		16.000
MAGNESIUM		NA
MANGANESE		NA
MERCURY		0.036
NICKEL		7.900
POTASSIUM		NA
SELENIUM		0.640
SILVER		2.400
SODIUM		NA
THALLIUM	<	23.000
VANADIUM		NA
ZINC		66.000

PESTICIDES		(MG/KG)
ALDRIN	<	0.003
alpha-BHC		0.009
beta-BHC	<	0.003
delta-BHC	<	0.002
gamma-BHC	<	0.0001
alpha-CHLORDANE		NA
gamma-CHLORDANE		NA
cis-NONACHLOR		NA
trans-NONACHLOR		NA
OXYCHLORDANE		NA
TOTAL CHLORDANE	<	0.010
p,p'-DDD		0.002
o,p'-DDD		NA
p,p'-DDE	<	0.002
o,p'-DDE		NA
p,p'-DDT	<	0.005
o,p'-DDT		NA
DIELDRIN	<	0.004
ENDOSULFAN I	<	0.004
ENDOSULFAN II	<	0.010
ENDOSULFAN SULFATE	<	0.020
ENDRIN	<	0.008
ENDRIN ALDEHYDE		NA
ENDRIN KETONE		NA
HEPTACHLOR	<	0.002
HEPTACHLOR EPOXIDE	<	0.002
HEXACHLOROBENZENE		NA
METHOXYCHLOR	<	0.020
PENTACHLOROANISOLE		NA
TOXAPHENE	<	0.200

BASE/NEUTRAL EXTRACTABLE COMPOUNDS	(MG/KG)
ACENAPHTHYLENE	NA
ACENAPHTHENE	NA
ANILINE	NA
4-CHLOROANILINE	NA
2-NITROANILINE	NA
3-NITROANILINE	NA
4-NITROANILINE	NA
ANTHRACENE	NA
BENZO(a)ANTHRACENE	NA
DIBENZO(a,h)ANTHRACENE	NA
3,3'-DICHLOROBENZIDINE	NA
1,2-DICHLOROBENZENE	NA
1,3-DICHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
1,2,4-TRICHLORBENZENE	NA
HEXACHLOROBENZENE	NA
NITROBENZENE	NA
BENZYL ALCOHOL	NA
CARBAZOLE	NA
CHRYSENE	NA
n-NITROSODIPHENYLAMINE	NA
n-NITROSO-di-n-PROPYLAMINE	NA
HEXACHLOROETHANE	NA
BIS(2-CHLOROETHYL)ETHER	NA
BIS(2-CHLOROISOPROPYL)ETHER	NA
4-BROMOPHENYL-PHENYLETHER	NA
4-CHLOROPHENYL-PHENYLETHER	NA
FLUORANTHENE	NA
FLUORENE	NA
BENZO(beta)FLUORANTHENE	NA
BENZO(kappa)FLUORANTHENE	NA
DIBENZOFURAN	NA
BIS(2-CHLOROETHOXY)METHANE	NA
ISOPHORONE	NA
NAPHTHALENE	NA
2-CHLORONAPHTHALENE	NA
2-METHYLNAPHTHALENE	NA
HEXACHLOROCYCLOPENTADIENE	NA
BENZO(ghi)PERYLENE	NA
PHENANTHRENE	NA
di-n-BUTYLPHTHALATE	NA
DIETHYLPHTHALATE	NA
DIMETHYLPHTHALATE	NA
di-n-OCTYLPHTHALATE	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA
BUTYLBENZYLPHTHALATE	NA
PYRENE	NA
BENZO(alpha)PYRENE	NA
INDENO(1,2,3-c,d)PYRENE	NA
2,4-DINITROTOLUENE	NA
2,6-DINITROTOLUENE	NA
HEXACHLOROBUTADIENE	NA
1,2-DIPHENYLHYDRAZINE	NA

ACID EXTRACTABLE COMPOUNDS	(MG/KG)
BENZOIC ACID	NA
PHENOL	NA
2-CHLOROPHENOL	NA
2,4-DICHLOROPHENOL	NA
2,4,5-TRICHLOROPHENOL	NA
2,4,6-TRICHLOROPHENOL	NA
PENTACHLOROPHENOL	NA
2-METHYLPHENOL	NA
4-METHYLPHENOL	NA
2,4-DIMETHYLPHENOL	NA
4-CHLORO-3-METHYLPHENOL	NA
4,6-DINITRO-2-METHYLPHENOL	NA
2-NITROPHENOL	NA
4-NITROPHENOL	NA
2,4-DINITROPHENOL	NA

PCBs	(MG/KG)
AROCLOR-1016 <	0.010
AROCLOR-1221 <	0.010
AROCLOR-1232 <	0.010
AROCLOR-1242 <	0.010
AROCLOR-1248 <	0.010
AROCLOR-1254 <	0.020
AROCLOR-1260 <	0.020
AROCLOR-1262	NA
TOTAL PCB	NA

FUEL OIL	NA
GASOLINE	NA
ACETONE	NA
BENZENE	NA
CHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
ETHYLBENZENE	NA
2-BUTANONE (MEK)	NA
CARBON DISULFIDE	NA
CHLOROETHANE	NA
1,1-DICHLOROETHANE	NA
1,2-DICHLOROETHANE	NA
1,1,1-TRICHLOROETHANE	NA
1,1,2-TRICHLOROETHANE	NA
1,1,2,2-TETRACHLOROETHANE	NA
2-CHLOROETHYLVINYLETHER	NA

VOLATILE ORGANIC COMPOUNDS (MG/KG)	
1,1-DICHLOROETHYLENE	NA
1,2-DICHLOROETHYLENE	NA
TRICHLOROETHYLENE(TOTAL)	NA
TETRACHLOROETHYLENE	NA
2-HEXANONE	NA
BROMOMETHANE	NA
TRIBROMOMETHANE (BROMOFORM)	NA
BROMODICHLOROMETHANE	NA
DIBROMOCHLOROMETHANE	NA
TRICHLOROFLUOROMETHANE	NA
CHLOROMETHANE	NA
DICHLOROMETHANE (METHYLENE CHLORIDE)	NA
TRICHLOROMETHANE (CHLOROFORM)	NA
TETRACHLOROMETHANE (CARBON TETRACHLORIDE)	NA
4-METHYL-2-PENTANONE	NA
1,2-DICHLOROPROPANE	NA
c-1,3-DICHLOROPROPYLENE	NA
t-1,3-DICHLOROPROPYLENE	NA
STYRENE	NA
TOLUENE	NA
VINYL ACETATE	NA
VINYL CHLORIDE	NA
TOTAL XYLENE	NA

PESTICIDES, PCBs, BASE NEUTRAL, ACID EXTRACTABLE AND VOLATILE ORGANIC COMPOUNDS ARE REPORTED ON A WET WEIGHT BASIS. PRINT DATE: 10-May-1996

NA=NOT ANALYZED ND=NONE DETECTED D=DUPLICATE ISDH=INDIANA STATE DEPARTMENT OF HEALTH
T.O.C.=TOTAL ORGANIC CARBON A.V.S.= ACID VOLATILE SULFIDES
OTHER FLAGS ARE EXPLAINED ON A SEPARATE SHEET

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OWM-BIOLOGICAL STUDIES
SEDIMENT CONTAMINATION RESULTS
IDEM SAMPLE NUMBER:

LAB NUMBER:DD0943 SITE:LAKE SHAFER COUNTY:WHITE SEDIMENT
COLLECTION DATE:20-Aug-1996 LOCATION:BIG MONON CREEK BASIN LAB:ISDH PREPARATION:COMPOSITE OF 3 GRABS

GENERAL PARAMETERS

% TOTAL SOLIDS	58.00
% MOISTURE	42.00
% VOLATILE SOLIDS	5.00
NH3-N (mg/kg)	NA
A.V.S. (mg/kg)	NA
T.O.C.(%)	NA
CYANIDE	< 0.125

(MG/KG wet weight)

METALS(dry weight)	(MG/KG)
ALUMINUM	NA
ANTIMONY	< 0.260
ARSENIC	3.800
BARIUM	NA
BERYLLIUM	< 2.600
CADMIUM	< 2.600
CALCIUM	NA
CHROMIUM	7.900
COBALT	NA
COPPER	11.000
IRON	NA
LEAD	8.300
MAGNESIUM	NA
MANGANESE	NA
MERCURY	0.033
NICKEL	4.600
POTASSIUM	NA
SELENIUM	0.320
SILVER	< 0.800
SODIUM	NA
THALLIUM	26.000
VANADIUM	NA
ZINC	55.000

PESTICIDES	(MG/KG)
ALDRIN	< 0.002
alpha-BHC	< 0.004
beta-BHC	< 0.003
delta-BHC	< 0.002
gamma-BHC	< 0.0001
alpha-CHLORDANE	NA
gamma-CHLORDANE	NA
cis-NONACHLOR	NA
trans-NONACHLOR	NA
OXYCHLORDANE	NA
TOTAL CHLORDANE	< 0.010
p,p'-DDD	< 0.002
o,p'-DDD	NA
p,p'-DDE	< 0.002
o,p'-DDE	NA
p,p'-DDT	< 0.002
o,p'-DDT	NA
DIELDRIN	0.001
ENDOSULFAN I	< 0.004
ENDOSULFAN II	< 0.010
ENDOSULFAN SULFATE	< 0.020
ENDRIN	< 0.008
ENDRIN ALDEHYDE	NA
ENDRIN KETONE	NA
HEPTACHLOR	< 0.002
HEPTACHLOR EPOXIDE	< 0.002
HEXACHLOROBENZENE	NA
METHOXYCHLOR	< 0.020
PENTACHLOROANISOLE	NA
TOXAPHENE	< 0.250

BASE/NEUTRAL EXTRACTABLE COMPOUNDS	(MG/KG)
ACENAPHTHYLENE	NA
ACENAPHTHENE	NA
ANILINE	NA
4-CHLOROANILINE	NA
2-NITROANILINE	NA
3-NITROANILINE	NA
4-NITROANILINE	NA
ANTHRACENE	NA
BENZO(a)ANTHRACENE	NA
DIBENZO(a,h)ANTHRACENE	NA
3,3'-DICHLOROBENZIDINE	NA
1,2-DICHLOROBENZENE	NA
1,3-DICHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
1,2,4-TRICHLORBENZENE	NA
HEXACHLOROBENZENE	NA
NITROBENZENE	NA
BENZYL ALCOHOL	NA
CARBAZOLE	NA
CHRYSENE	NA
n-NITROSODIPHENYLAMINE	NA
n-NITROSO-di-n-PROPYLAMINE	NA
HEXACHLOROETHANE	NA
BIS(2-CHLOROETHYL)ETHER	NA
BIS(2-CHLOROISOPROPYL)ETHER	NA
4-BROMOPHENYL-PHENYLETHER	NA
4-CHLOROPHENYL-PHENYLETHER	NA
FLUORANTHENE	NA
FLUORENE	NA
BENZO(beta)FLUORANTHENE	NA
BENZO(kappa)FLUORANTHENE	NA
DIBENZOFURAN	NA
BIS(2-CHLOROETHOXY)METHANE	NA
ISOPHORONE	NA
NAPHTHALENE	NA
2-CHLORONAPHTHALENE	NA
2-METHYLNAPHTHALENE	NA
HEXACHLOROCYCLOPENTADIENE	NA
BENZO(ghi)PERYLENE	NA
PHENANTHRENE	NA
di-n-BUTYLPHTHALATE	NA
DIETHYLPHTHALATE	NA
DIMETHYLPHTHALATE	NA
di-n-OCTYLPHTHALATE	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA
BUTYLBENZYLPHTHALATE	NA
PYRENE	NA
BENZO(alpha)PYRENE	NA
INDENO(1,2,3-c,d)PYRENE	NA
2,4-DINITROTOLUENE	NA
2,6-DINITROTOLUENE	NA
HEXACHLOROBUTADIENE	NA
1,2-DIPHENYLHYDRAZINE	NA

ACID EXTRACTABLE COMPOUNDS	(MG/KG)
BENZOIC ACID	NA
PHENOL	NA
2-CHLOROPHENOL	NA
2,4-DICHLOROPHENOL	NA
2,4,5-TRICHLOROPHENCL	NA
2,4,6-TRICHLOROPHENOL	NA
PENTACHLOROPHENOL	NA
2-METHYLPHENOL	NA
4-METHYLPHENOL	NA
2,4-DIMETHYLPHENOL	NA
4-CHLORO-3-METHYLPHENOL	NA
4,6-DINITRO-2-METHYLPHENOL	NA
2-NITROPHENOL	NA
4-NITROPHENOL	NA
2,4-DINITROPHENOL	NA

PCBs	(MG/KG)
AROCLOR-1016	< 0.010
AROCLOR-1221	< 0.010
AROCLOR-1232	< 0.010
AROCLOR-1242	< 0.010
AROCLOR-1248	< 0.010
AROCLOR-1254	< 0.020
AROCLOR-1260	< 0.020
AROCLOR-1262	NA
TOTAL PCB	NA

FUEL OIL	NA
GASOLINE	NA
ACETONE	NA
BENZENE	NA
CHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
ETHYLBENZENE	NA
2-BUTANONE (MEK)	NA
CARBON DISULFIDE	NA
CHLOROETHANE	NA
1,1-DICHLOROETHANE	NA
1,2-DICHLOROETHANE	NA
1,1,1-TRICHLOROETHANE	NA
1,1,2-TRICHLOROETHANE	NA
1,1,2,2-TETRACHLOROETHANE	NA
2-CHLOROETHYLVINYLETHER	NA

VOLATILE ORGANIC COMPOUNDS	(MG/KG)
1,1-DICHLOROETHYLENE	NA
1,2-DICHLOROETHYLENE	NA
TRICHLOROETHYLENE(TOTAL)	NA
TETRACHLOROETHYLENE	NA
2-HEXANONE	NA
BROMOMETHANE	NA
TRIBROMOMETHANE (BROMOFORM)	NA
BROMODICHLOROMETHANE	NA
DIBROMOCHLOROMETHANE	NA
TRICHLOROFLUOROMETHANE	NA
CHLOROMETHANE	NA
DICHLOROMETHANE (METHYLENE CHLORIDE)	NA
TRICHLOROMETHANE (CHLOROFORM)	NA
TETRACHLOROMETHANE (CARBON TETRACHLORIDE)	NA
4-METHYL-2-PENTANONE	NA
1,2-DICHLOROPROPANE	NA
T-1,3-DICHLOROPROPYLENE	NA
C-1,3-DICHLOROPROPYLENE	NA
STYRENE	NA
TOLUENE	NA
VINYL ACETATE	NA
VINYL CHLORIDE	NA
TOTAL XYLENE	NA

PESTICIDES, PCBs, BASE NEUTRAL, ACID EXTRACTABLE AND VOLATILE ORGANIC COMPOUNDS ARE REPORTED ON A WET WEIGHT BASIS.

PRINT DATE: 10-May-1996

NA=NOT ANALYZED ND=NONE DETECTED D=DUPLICATE ISDH= INDIANA STATE DEPARTMENT OF HEALTH
T.O.C.=TOTAL ORGANIC CARBON A.V.S.= ACID VOLATILE SULFIDES
OTHER FLAGS ARE EXPLAINED ON A SEPARATE SHEET

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OWM-BIOLOGICAL STUDIES
SEDIMENT CONTAMINATION RESULTS
IDEM SAMPLE NUMBER:

LAB NUMBER:DD2946 SITE:LAKE FREEMAN COUNTY:CARROLL SEDIMENT
COLLECTION DATE:21-Aug-1996 LOCATION:DAM AREA LAB:ISDH PREPARATION:COMPOSITE OF 3 GRABS

GENERAL PARAMETERS

% TOTAL SOLIDS		80.00
% MOISTURE		20.00
% VOLATILE SOLIDS		2.00
NH3-N (mg/kg)		NA
A.V.S. (mg/kg)		NA
T.O.C.(%)		NA
CYANIDE	<	0.125

(MG/KG wet weight)

METALS:(dry weight)		(MG/KG)
ALUMINUM		NA
ANTIMONY	<	0.270
ARSENIC		5.900
BARIUM		NA
BERYLLIUM	<	2.700
CADMIUM	<	2.700
CALCIUM		NA
CHROMIUM		8.100
COBALT		NA
COPPER		5.400
IRON		NA
LEAD	<	8.100
MAGNESIUM		NA
MANGANESE		NA
MERCURY		0.007
NICKEL	<	5.400
POTASSIUM		NA
SELENIUM	<	0.320
SILVER	<	0.210
SODIUM		NA
THALLIUM	<	27.000
VANADIUM		NA
ZINC		9.800

PESTICIDES		(MG/KG)
ALDRIN	<	0.002
alpha-BHC		0.001
beta-BHC	<	0.003
delta-BHC	<	0.002
gamma-BHC	<	0.0001
alpha-CHLORDANE		NA
gamma-CHLORDANE		NA
cis-NONACHLOR		NA
trans-NONACHLOR		NA
OXYCHLORDANE		NA
TOTAL CHLORDANE	<	0.010
p,p'-DDD	<	0.002
o,p'-DDD		NA
p,p'-DDE	<	0.002
o,p'-DDE		NA
p,p'-DDT	<	0.002
o,p'-DDT		NA
DIELDRIN	<	0.001
ENDOSULFAN I	<	0.004
ENDOSULFAN II	<	0.010
ENDOSULFAN SULFATE	<	0.020
ENDRIN	<	0.008
ENDRIN ALDEHYDE		NA
ENDRIN KETONE		NA
HEPTACHLOR	<	0.002
HEPTACHLOR EPOXIDE	<	0.002
HEXACHLOROBENZENE		NA
METHOXYCHLOR	<	0.020
PENTACHLOROANISOLE		NA
TOXAPHENE	<	0.200

BASE/NEUTRAL EXTRACTABLE COMPOUNDS	(MG/KG)
ACENAPHTHYLENE	NA
ACENAPHTHENE	NA
ANILINE	NA
4-CHLOROANILINE	NA
2-NITROANILINE	NA
3-NITROANILINE	NA
4-NITROANILINE	NA
ANTHRACENE	NA
BENZO(a)ANTHRACENE	NA
DIBENZO(a,h)ANTHRACENE	NA
3,3'-DICHLOROBENZIDINE	NA
1,2-DICHLOROBENZENE	NA
1,3-DICHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
1,2,4-TRICHLORBENZENE	NA
HEXACHLOROBENZENE	NA
NITROBENZENE	NA
BENZYL ALCOHOL	NA
CARBAZOLE	NA
CHRYSENE	NA
n-NITROSODIPHENYLAMINE	NA
n-NITROSO-di-n-PROPYLAMINE	NA
HEXACHLOROETHANE	NA
BIS(2-CHLOROETHYL)ETHER	NA
BIS(2-CHLOROISOPROPYL)ETHER	NA
4-BROMOPHENYL-PHENYLETHER	NA
4-CHLOROPHENYL-PHENYLETHER	NA
FLUORANTHENE	NA
FLUORENE	NA
BENZO(beta)FLUORANTHENE	NA
BENZO(kappa)FLUORANTHENE	NA
DIBENZOFURAN	NA
BIS(2-CHLOROETHOXY)METHANE	NA
ISOPHORONE	NA
NAPHTHALENE	NA
2-CHLORONAPHTHALENE	NA
2-METHYLNAPHTHALENE	NA
HEXACHLOROCYCLOPENTADIENE	NA
BENZO(ghi)PERYLENE	NA
PHENANTHRENE	NA
di-n-BUTYLPHTHALATE	NA
DIETHYLPHTHALATE	NA
DIMETHYLPHTHALATE	NA
di-n-OCTYLPHTHALATE	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA
BUTYLBENZYLPHTHALATE	NA
PYRENE	NA
BENZO(alpha)PYRENE	NA
INDENO(1,2,3-c,d)PYRENE	NA
2,4-DINITROTOLUENE	NA
2,6-DINITROTOLUENE	NA
HEXACHLOROBUTADIENE	NA
1,2-DIPHENYLHYDRAZINE	NA

ACID EXTRACTABLE COMPOUNDS	(MG/KG)
BENZOIC ACID	NA
PHENOL	NA
2-CHLOROPHENOL	NA
2,4-DICHLOROPHENOL	NA
2,4,5-TRICHLOROPHENOL	NA
2,4,6-TRICHLOROPHENOL	NA
PENTACHLOROPHENOL	NA
2-METHYLPHENOL	NA
4-METHYLPHENOL	NA
2,4-DIMETHYLPHENOL	NA
4-CHLORO-3-METHYLPHENOL	NA
4,6-DINITRO-2-METHYLPHENOL	NA
2-NITROPHENOL	NA
4-NITROPHENOL	NA
2,4-DINITROPHENOL	NA

PCBs		(MG/KG)
AROCLOR-1016	<	0.010
AROCLOR-1221	<	0.010
AROCLOR-1232	<	0.010
AROCLOR-1242	<	0.010
AROCLOR-1248	<	0.010
AROCLOR-1254	<	0.020
AROCLOR-1260	<	0.020
AROCLOR-1262		NA
TOTAL PCB		NA

FUEL OIL	NA
GASOLINE	NA
ACETONE	NA
BENZENE	NA
CHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
ETHYLBENZENE	NA
2-BUTANONE (MEK)	NA
CARBON DISULFIDE	NA
CHLOROETHANE	NA
1,1-DICHLOROETHANE	NA
1,2-DICHLOROETHANE	NA
1,1,1-TRICHLOROETHANE	NA
1,1,2-TRICHLOROETHANE	NA
1,1,2,2-TETRACHLOROETHANE	NA
2-CHLOROETHYLVINYLETHER	NA

VOLATILE ORGANIC COMPOUNDS	(MG/KG)
1,1-DICHLOROETHYLENE	NA
1,2-DICHLOROETHYLENE	NA
TRICHLOROETHYLENE(TOTAL)	NA
TETRACHLOROETHYLENE	NA
2-HEXANONE	NA
BROMOMETHANE	NA
TRIBROMOMETHANE (BROMOFORM)	NA
BROMODICHLOROMETHANE	NA
DIBROMOCHLOROMETHANE	NA
TRICHLOROFLUOROMETHANE	NA
CHLOROMETHANE	NA
DICHLOROMETHANE (METHYLENE CHLORIDE)	NA
TRICHLOROMETHANE (CHLOROFORM)	NA
TETRACHLOROMETHANE (CARBON TETRACHLORIDE)	NA
4-METHYL-2-PENTANONE	NA
1,2-DICHLOROPROPANE	NA
t-1,3-DICHLOROPROPYLENE	NA
c-1,3-DICHLOROPROPYLENE	NA
STYRENE	NA
TOLUENE	NA
VINYL ACETATE	NA
VINYL CHLORIDE	NA
TOTAL XYLENE	NA

PESTICIDES, PCBs, BASE NEUTRAL, ACID EXTRACTABLE AND VOLATILE ORGANIC COMPOUNDS ARE REPORTED ON A WET WEIGHT BASIS.
PRINT DATE: 13-May-1996

NA=NOT ANALYZED ND=NONE DETECTED D=DUPLICATE ISDH= INDIANA STATE DEPARTMENT OF HEALTH
T.O.C.=TOTAL ORGANIC CARBON A.V.S.= ACID VOLATILE SULFIDES
OTHER FLAGS ARE EXPLAINED ON A SEPARATE SHEET

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OWM-BIOLOGICAL STUDIES
SEDIMENT CONTAMINATION RESULTS
ICEM SAMPLE NUMBER:

LAB NUMBER:DD2947 SITE:LAKE FREEMAN COUNTY:CARROLL |SEDIMENT
COLLECTION DATE:21-Aug-1996 LOCATION:D/S MONTICELLO STP LAB:ISDH |PREPARATION:COMPOSITE OF 3 GRABS

GENERAL PARAMETERS

% TOTAL SOLIDS		64.00
% MOISTURE		36.00
% VOLATILE SOLIDS		4.00
NH3-N (mg/kg)		NA
A.V.S. (mg/kg)		NA
T.O.C.(%)		NA
CYANIDE	<	0.125

(MG/KG wet weight)

METALS (dry weight)		(MG/KG)
ALUMINUM		NA
ANTIMONY	<	0.250
ARSENIC		4.500
BARIUM		NA
BERYLLIUM	<	2.500
CADMIUM	<	2.500
CALCIUM		NA
CHROMIUM		12.000
COBALT		NA
COPPER		9.200
IRON		NA
LEAD		21.000
MAGNESIUM		NA
MANGANESE		NA
MERCURY		0.029
NICKEL		7.100
POTASSIUM		NA
SELENIUM	<	0.310
SILVER	<	2.500
SODIUM		NA
THALLIUM	<	25.000
VANADIUM		NA
ZINC		44.000

PESTICIDES		(MG/KG)
ALDRIN	<	0.004
alpha-BHC	<	0.005
beta-BHC	<	0.003
delta-BHC	<	0.002
gamma-BHC	<	0.0001
alpha-CHLORDANE		NA
gamma-CHLORDANE		NA
cis-NONACHLOR		NA
trans-NONACHLOR		NA
OXYCHLORDANE		NA
TOTAL CHLORDANE	<	0.010
p,p'-DDD	<	0.002
o,p'-DDD		NA
p,p'-DDE	<	0.002
o,p'-DDE		NA
p,p'-DDT	<	0.002
o,p'-DDT		NA
DIELDRIN	<	0.005
ENDOSULFAN I	<	0.004
ENDOSULFAN II	<	0.010
ENDOSULFAN SULFATE	<	0.020
ENDRIN	<	0.008
ENDRIN ALDEHYDE		NA
ENDRIN KETONE		NA
HEPTACHLOR	<	0.002
HEPTACHLOR EPOXIDE	<	0.002
HEXACHLOROBENZENE		NA
METHOXYCHLOR	<	0.020
PENTACHLOROANISOLE		NA
TOXAPHENE	<	0.200

BASE/NEUTRAL EXTRACTABLE COMPOUNDS	(MG/KG)
ACENAPHTHYLENE	NA
ACENAPHTHENE	NA
ANILINE	NA
4-CHLOROANILINE	NA
2-NITROANILINE	NA
3-NITROANILINE	NA
4-NITROANILINE	NA
ANTHRACENE	NA
BENZO(a)ANTHRACENE	NA
DIBENZO(a,h)ANTHRACENE	NA
3,3'-DICHLOROBENZIDINE	NA
1,2-DICHLOROBENZENE	NA
1,3-DICHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
1,2,4-TRICHLORBENZENE	NA
HEXACHLOROBENZENE	NA
NITROBENZENE	NA
BENZYL ALCOHOL	NA
CARBAZOLE	NA
CHRYSENE	NA
n-NITROSODIPHENYLAMINE	NA
n-NITROSO-di-n-PROPYLAMINE	NA
HEXACHLOROETHANE	NA
BIS(2-CHLOROETHYL)ETHER	NA
BIS(2-CHLOROISOPROPYL)ETHER	NA
4-BROMOPHENYL-PHENYLETHER	NA
4-CHLOROPHENYL-PHENYLETHER	NA
FLUORANTHENE	NA
FLUORENE	NA
BENZO(beta)FLUORANTHENE	NA
BENZO(kappa)FLUORANTHENE	NA
DIBENZOFURAN	NA
BIS(2-CHLOROETHOXY)METHANE	NA
ISOPHORONE	NA
NAPHTHALENE	NA
2-CHLORONAPHTHALENE	NA
2-METHYLNAPHTHALENE	NA
HEXACHLOROCYCLOPENTADIENE	NA
BENZO(ghi)PERYLENE	NA
PHENANTHRENE	NA
di-n-BUTYLPHTHALATE	NA
DIETHYLPHTHALATE	NA
DIMETHYLPHTHALATE	NA
di-n-OCTYLPHTHALATE	NA
BIS(2-ETHYLHEXYL)PHTHALATE	NA
BUTYLBENZYLPHTHALATE	NA
PYRENE	NA
BENZO(alpha)PYRENE	NA
INDENO(1,2,3-c,d)PYRENE	NA
2,4-DINITROTOLUENE	NA
2,6-DINITROTOLUENE	NA
HEXACHLOROBUTADIENE	NA
1,2-DIPHENYLHYDRAZINE	NA

ACID EXTRACTABLE COMPOUNDS	(MG/KG)
BENZOIC ACID	NA
PHENOL	NA
2-CHLOROPHENOL	NA
2,4-DICHLOROPHENOL	NA
2,4,5-TRICHLOROPHENOL	NA
2,4,6-TRICHLOROPHENOL	NA
PENTACHLOROPHENOL	NA
2-METHYLPHENOL	NA
4-METHYLPHENOL	NA
2,4-DIMETHYLPHENOL	NA
4-CHLORO-3-METHYLPHENOL	NA
4,6-DINITRO-2-METHYLPHENOL	NA
2-NITROPHENOL	NA
4-NITROPHENOL	NA
2,4-DINITROPHENOL	NA

PCBs	(MG/KG)
AROCLOR-1016	< 0.010
AROCLOR-1221	< 0.010
AROCLOR-1232	< 0.010
AROCLOR-1242	< 0.010
AROCLOR-1248	< 0.010
AROCLOR-1254	< 0.020
AROCLOR-1260	< 0.020
AROCLOR-1262	NA
TOTAL PCB	NA

FUEL OIL	NA
GASOLINE	NA
ACETONE	NA
BENZENE	NA
CHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
ETHYLBENZENE	NA
2-BUTANONE (MEK)	NA
CARBON DISULFIDE	NA
CHLOROETHANE	NA
1,1-DICHLOROETHANE	NA
1,2-DICHLOROETHANE	NA
1,1,1-TRICHLOROETHANE	NA
1,1,2-TRICHLOROETHANE	NA
1,1,2,2-TETRACHLOROETHANE	NA
2-CHLOROETHYLVINYLETHER	NA

VOLATILE ORGANIC COMPOUNDS	(MG/KG)
1,1-DICHLOROETHYLENE	NA
1,2-DICHLOROETHYLENE	NA
TRICHLOROETHYLENE (TOTAL)	NA
TETRACHLOROETHYLENE	NA
2-HEXANONE	NA
BROMOMETHANE	NA
TRIBROMOMETHANE (BROMOFORM)	NA
BROMODICHLOROMETHANE	NA
DIBROMOCHLOROMETHANE	NA
TRICHLOROFLUOROMETHANE	NA
CHLOROMETHANE	NA
DICHLOROMETHANE (METHYLENE CHLORIDE)	NA

TRICHLOROMETHANE (CHLOROFORM)	NA
TETRACHLOROMETHANE (CARBON TETRACHLORIDE)	NA
4-METHYL-2-PENTANONE	NA
1,2-DICHLOROPROPANE	NA
c-1,3-DICHLOROPROPYLENE	NA
t-1,3-DICHLOROPROPYLENE	NA
STYRENE	NA
TOLUENE	NA
VINYL ACETATE	NA
VINYL CHLORIDE	NA
TOTAL XYLENE	NA

PESTICIDES, PCBs, BASE NEUTRAL, ACID EXTRACTABLE AND VOLATILE ORGANIC COMPOUNDS ARE REPORTED ON A WET WEIGHT BASIS. PRINT DATE: 10-May-1996

NA=NOT ANALYZED ND=NONE DETECTED D=DUPLICATE ISDH= INDIANA STATE DEPARTMENT OF HEALTH
T.O.C.=TOTAL ORGANIC CARBON A.V.S.= ACID VOLATILE SULFIDES
OTHER FLAGS ARE EXPLAINED ON A SEPARATE SHEET

APPENDIX "D"

SOILS INVESTIGATION

PREPARED BY:
ALT & WITZIG ENGINEERING, INC.
GEOTECHNICAL DIVISION
PROJECT NO: S5452

PREPARED FOR:
COMMONWEALTH ENGINEERS, INC.
INDIANAPOLIS, INDIANA

AUGUST 31, 1995

Alt & Witzig Engineering, Inc.
3405 W. 96th Street • Indianapolis, Indiana 46268
(317) 875-7000 • Fax (317) 876-3705

August 31, 1995

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, Indiana 46237
ATTN: Mr. Roger Kottlowski

RE: Subsurface Investigation
Lake Shafer Enhancement Project
Monticello, Indiana
Alt & Witzig File: S5452

Gentlemen:

Pursuant to your request, the following report and lab data is submitted for the subsurface investigation for the proposed Lake Shafer Enhancement Project.

A subsurface investigation was performed at this site. The purpose of the investigation was to evaluate the soil conditions and bedrock depth with regard to the tributary bay sediment basins.

The boring logs were performed by hand due to the inaccessibility of the sites. Exceptions were borings SB-3K, SB-2H, and SB-4H which were drilled with a conventional truck mounted drill rig. The logs contain descriptions of the soils encountered, consistencies based on field observations, and any other note worthy observations made during the field and laboratory phase of this project.

The surface elevations noted on the boring logs were interpolated from a topographic survey provided by Commonwealth Engineers, Inc. They are presumed accurate to within +/- 1 foot.

None of our field borings encountered bedrock within the depth of the respective borings. However, borings SB-3K, and SB-2H encountered layers of large cobbles at depths ranging from ten (10) to fifteen (15) feet below grade. Some difficulties may be encountered during sheet pile driving if these cobble/rock layers are encountered.

Often, because of design and construction details which occur on a project, questions arise concerning the soils conditions. If we can give further service in these matters, please contact us at your convenience.

Very truly yours,

ALT & WITZIG ENGINEERING, INC.

John Winstanley
Project Engineer

Thomas J. Coffey P.E.

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-1K

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.

Date Completed 8/23/95 Hammer Drop _____ in.

Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 92.4	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER												Keans Bay
87.4		5.0	5										Very Soft Deposit
	Gray to Black Sandy SILT with some Organics, leaves wood												Soil Contained Air, (Methane)
84.4		8.0											Soft to Medium Stiff Deposit
	Gray to Black Sandy SILT with trace of Organics, Gravel												
82.4		10.0	10										Loose to Medium Dense
	Gray to Black Fine SAND with Silt												
80.4		12.0											
	Boring terminated at 12.0 feet.												

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-2K

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.

Date Completed 8/23/95 Hammer Drop _____ in.

Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 92.4	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER												Keans Bay
89.4		3.0											
	Black SILT with trace of Sand and some Organic matter												Very Soft Deposit, No Resistance
87.4		5.0	5										
	Gray to Black SILT (Soft to Medium Stiff)												
85.4		7.0											
	Gray Very Fine Silty SAND (Medium Dense)												
83.4		9.0											
	Boring terminated at 9.0 feet.												

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-3K

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.

Date Completed 8/24/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 92.4	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
92.1	Brown Clayey SILT with a trace of Organics (topsoil)	0.3										Keans Bay
				1	SS			12				
	Gray sandy SILT with Organics		5	2	SS			8				
				3	SS		▽	20				
82.9		9.5										
82.4	Cobbles	10.0	10	4	SS			50/3				
	Gray Sandy Silty CLAY with Gravel		15	5	SS			18				
76.4	Boring terminated at 16.0 feet.	16.0										

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion 8.0 ft.
▼ After _____ hours _____ ft.
○ Water on Rods None ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-1H

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.

Date Completed 8/23/95 Hammer Drop _____ in.

Boring Method HSA Spoon Sampler OD _____ in.

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 98.3	Strata Depth	Depth Scale	Sample No.	TEST DATA: Sample Type / Sampler Graphics / Recovery Graphics / Ground Water / Standard Penetration Test, N - blows/foot / Qu-tsf Unconfined Compressive Strength / pp-tsf Pocket Penetrometer / Moisture Content x	Remarks
96.8	WATER	1.5				(Honey Creek)
	Gray to Black Gravely SAND with Silt					
93.8		4.5				
92.8	(No Recovery) Possible quick condition, Assume: Organic layer or Wet SILT/SAND	5.5	5			
	Gray SILT with trace of SAND (Stiff)					
90.3		8.0				
	Boring terminated at 8.0 feet.					

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-2H

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.

Date Completed 8/24/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 98.4	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
98.2	Brown Clayey SILT with a trace of Organics (topsoil)	0.2										Honey Creek Bay
	Black Wet Silty SAND (Very Loose)			1	SS		▽	2				
93.9		4.5	5	2	SS		○	2				
	Blue Gravely Sandy SILT with Organics			3	SS			1				
88.9		9.5	10	4	SS			1				
	Gray SILT											
			15	5	SS			50/3				
82.4	Boring terminated at 16.0 feet.	16.0										Driving on Rocks/Cobbles

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion 2.0 ft.
▼ After _____ hours _____ ft.
○ Water on Rods 5.0 ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-3H

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.

Date Completed 8/23/95 Hammer Drop _____ in.

Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 98.3	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER											(Honey Creek)
95.3		3.0										
	Black SAND and GRAVEL with Silt (Medium Dense)											
93.3		5.0	5									
92.3	Very Soft Material (No Resistance) Assumed Organic layer or "quick SILT,SAND	6.0										No Recovery
	Gray Medium to Coarse SAND and GRAVEL with Silt											Medium Stiff
90.3		8.0										Very Stiff
89.3	Brown Sandy Silty CLAY	9.0										
	Boring terminated at 9.0 feet.											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc.
PROJECT NAME Lake Shafer Enhancement Project
PROJECT LOCATION Lake Shafer

BORING # SB-4H
Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95
Date Completed 8/24/95
Boring Method HSA
Hammer Wt. 140 lbs.
Hammer Drop 30 in.
Spoon Sampler OD 2 in.

STRATA ELEV.	SOIL CLASSIFICATION (SURFACE ELEVATION 98.4)	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	TEST DATA: Standard Penetration Test, N - blows/foot	TEST DATA: Qu-tsf Unconfined Compressive Strength	TEST DATA: PP-tsf Pocket Penetrometer	TEST DATA: Moisture Content x	Remarks
98.2	Brown Clayey SILT with a trace of Organics (topsoil)	0.2										Honey Creek Bay
				1	SS		▽	4				
	Gray Sandy SILT with trace of Clay and Organics		5	2	SS			2				
				3	SS			10				
89.4		9.0					○					
			10	4	SS			22				
	Brown Fine SAND											
83.9		14.5										
			15	5	SS			35				
	Brown Sandy Silty CLAY											
81.4		17.0										
	Gray Silty SAND											
			20	6	SS			30				
77.4	Boring terminated at 21.0 feet.	21.0										

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
▽ At Completion 4.0 ft.
▼ After _____ hours _____ ft.
○ Water on Rods 9.0 ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc.
PROJECT NAME Lake Shafer Enhancement Project
PROJECT LOCATION Lake Shafer

BORING # SB-1M
Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95
Date Completed 8/23/95
Boring Method HSA
Hammer Wt. _____ lbs.
Hammer Drop _____ in.
Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 93.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
92.0	WATER	1.0											(Monon Bay)
	Black Very Soft Sandy SILT with high organic content												No Recovery Hand Sample
88.0		5.0	5										
	Black Silty CLAY												
86.0		7.0											
	Boring terminated at 7.0 feet.												

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-2M

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.

Date Completed 8/23/95 Hammer Drop _____ in.

Boring Method HSA Spoon Sampler OD _____ in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION (SURFACE ELEVATION 93.0)	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
91.5	WATER	1.5										(Monon Bay)
89.5	Gray Sandy Silty CLAY (Soft) with shells/organics	3.5										
87.5	Brown Sandy Silty CLAY (Medium Stiff)	5.5	5									
85.5	Brown Hard Silty Sandy CLAY	7.5										
	Boring terminated at 7.5 feet.											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-3M

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/23/95 Hammer Wt. _____ lbs.

Date Completed 8/23/95 Hammer Drop _____ in.

Boring Method HSA Spoon Sampler OD _____ in.

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 93.0	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content x	Remarks
91.5	WATER	1.5										(Monon Bay)
89.5	Black Very Soft Clay SILT with high amount of organics	3.5										
87.5	Black Soft Clayey SILT	5.5	5									
85.5	Black Medium Stiff SILT	7.5										
	Boring terminated at 7.5 feet.											

TEST DATA

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc.
PROJECT NAME Lake Shafer Enhancement Project
PROJECT LOCATION Lake Shafer

BORING # SB-1G
Alt & Witzig File No. S5452

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95
Date Completed 8/24/95
Boring Method HSA
Hammer Wt. 140 lbs.
Hammer Drop 30 in.
Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 96.5	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER											Hoagland Bay
94.0		2.5										
	Brown Wet Fine SAND and GRAVEL		5									
88.0		8.5										
	Gray Fine Sandy SILT		10									
84.5		12.0										
	Boring terminated at 12.0 feet.											

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-2G

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.

Date Completed 8/24/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

STRATA ELEV.	SOIL CLASSIFICATION / SURFACE ELEVATION	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER	1.5										Hoagland Bay
	Gray Silty SAND and GRAVEL with Organics	5.5	5									
	Gray SAND and GRAVEL	7.5										
	Gray Clayey SAND (Medium Stiff)	9.5										
	Boring terminated at 9.5 feet.											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-1N

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.

Date Completed 8/24/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 91.8	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER											North Bedford Bay
89.8		2.0										
88.8	Black Very Soft Sandy SILT with Organics (drift wood)	3.0										
	Brown Medium Dense Fine SAND		5									
83.8		8.0										
	Boring terminated at 8.0 feet.											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-2N

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.

Date Completed 8/24/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 91.8	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
	WATER											North Bedford Bay
88.3		3.5										
87.3	Black Very Soft Sandy SILT with some Organics	4.5										
	Brown to Gray Wet SAND and GRAVEL		5									
84.3		7.5										
	Brown Medium to Coarse Dense SAND and GRAVEL											
82.3		9.5										
	Boring terminated at 9.5 feet.											

Sample Type
- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Groundwater
- ▽ At Completion _____ ft.
- ▼ After _____ hours _____ ft.
- ○ Water on Rods _____ ft.

Boring Method
- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-3N

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/24/95 Hammer Wt. 140 lbs.

Date Completed 8/24/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 91.8	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
												North Bedford Bay
	WATER											
88.3		3.5										
87.3	Black Very Soft Sandy SILT	4.5										
	Gray Fine Silty SAND (Loose to Medium Dense)		5									
85.3		6.5										
	Brown Coarse SAND and GRAVEL (Medium Dense)											
83.3		8.5										
	Boring terminated at 8.5 feet.											

Sample Type
- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

Groundwater
- ▽ At Completion _____ ft.
- ▼ After _____ hours _____ ft.
- ○ Water on Rods _____ ft.

Boring Method
- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-2C

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/25/95 Hammer Wt. 140 lbs.

Date Completed 8/25/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 98.3	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics / Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
96.8	WATER	1.5										Carnahan Ditch
94.8	Black Sandy SILT with Organics	3.5										
92.8	Black SILT with trace of Sand	5.5	5									
90.8	Very Loose Wet Fine SAND	7.5										
88.8	Brown Fine to Coarse SAND	9.5										
	Boring terminated at 9.5 feet.											

Sample Type

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater

▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

Boring Method

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

RECORD OF SUBSURFACE EXPLORATION

Alt & Witzig Engineering, Inc.

CLIENT Commonwealth Engineers, Inc. BORING # SB-1C

PROJECT NAME Lake Shafer Enhancement Project Alt & Witzig File No. S5452

PROJECT LOCATION Lake Shafer

DRILLING and SAMPLING INFORMATION

Date Started 8/25/95 Hammer Wt. 140 lbs.

Date Completed 8/25/95 Hammer Drop 30 in.

Boring Method HSA Spoon Sampler OD 2 in.

TEST DATA

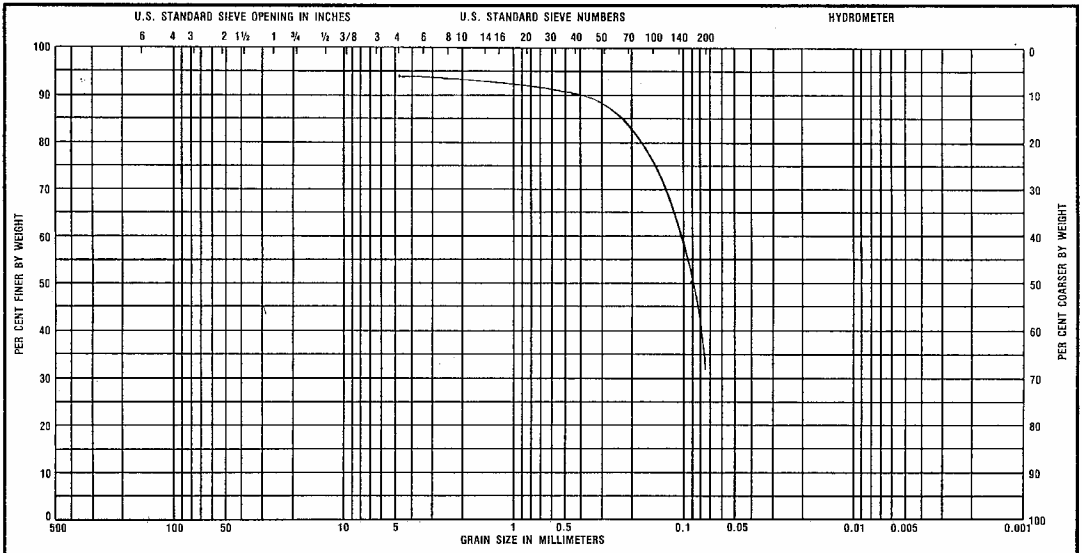
STRATA ELEV.	SOIL CLASSIFICATION SURFACE ELEVATION 98.3	Strata Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Ground Water	Standard Penetration Test, N - blows/foot	Qu-tsf Unconfined Compressive Strength	PP-tsf Pocket Penetrometer	Moisture Content %	Remarks
96.8	WATER	1.5											Caranahan Ditch
94.8	Black Sandy SILT with some Organics	3.5											
92.8	Wet Fine SAND (Very Loose)	5.5	5										
90.8	Very Loose Wet Fine SAND	7.5											
88.8	Medium Dense Silty SAND	9.5											
	Boring terminated at 9.5 feet.												

Sample Type
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
CU - Cuttings
CT - Continuous Tube

Groundwater
▽ At Completion _____ ft.
▼ After _____ hours _____ ft.
○ Water on Rods _____ ft.

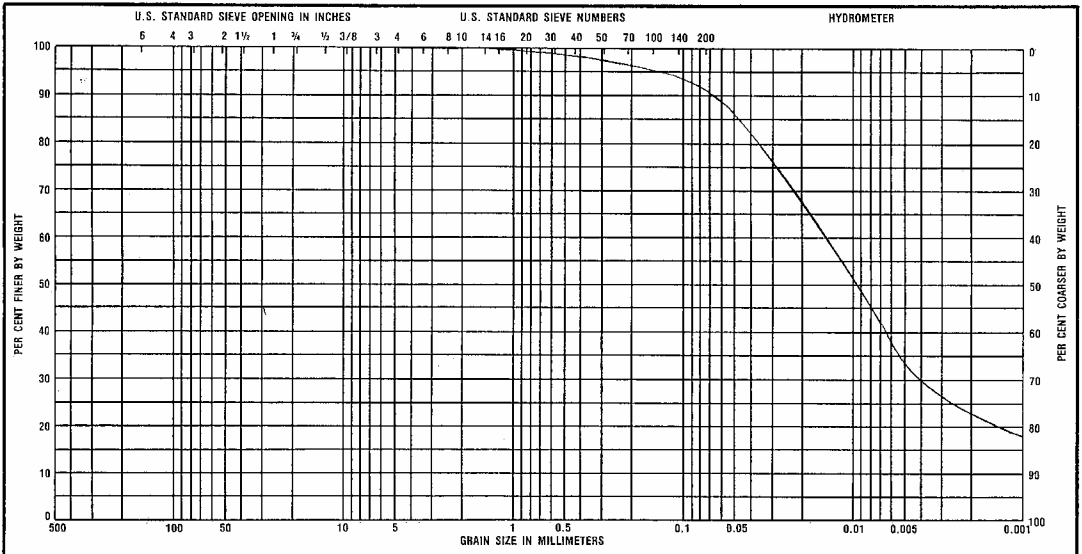
Boring Method
HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

GRAIN SIZE DISTRIBUTION CURVE



Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
SB-1K		4-6'	Brown Fine Sand					Keans Bay
SB-1H								S5452
								Date

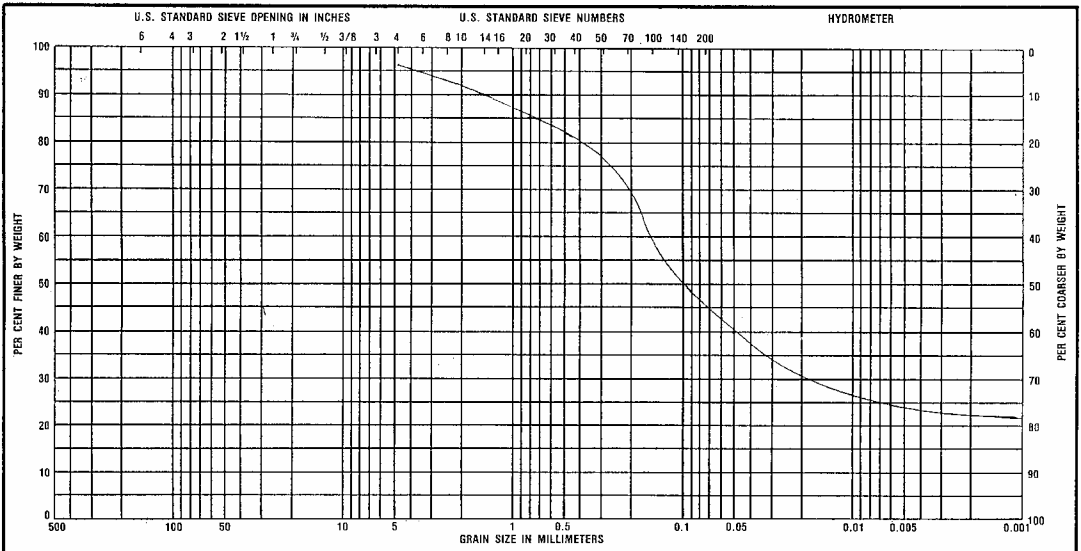
GRAIN SIZE DISTRIBUTION CURVE



Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
SB-2		2-4'	Gray Silt w/Organic					Keans Bay S5452

Date

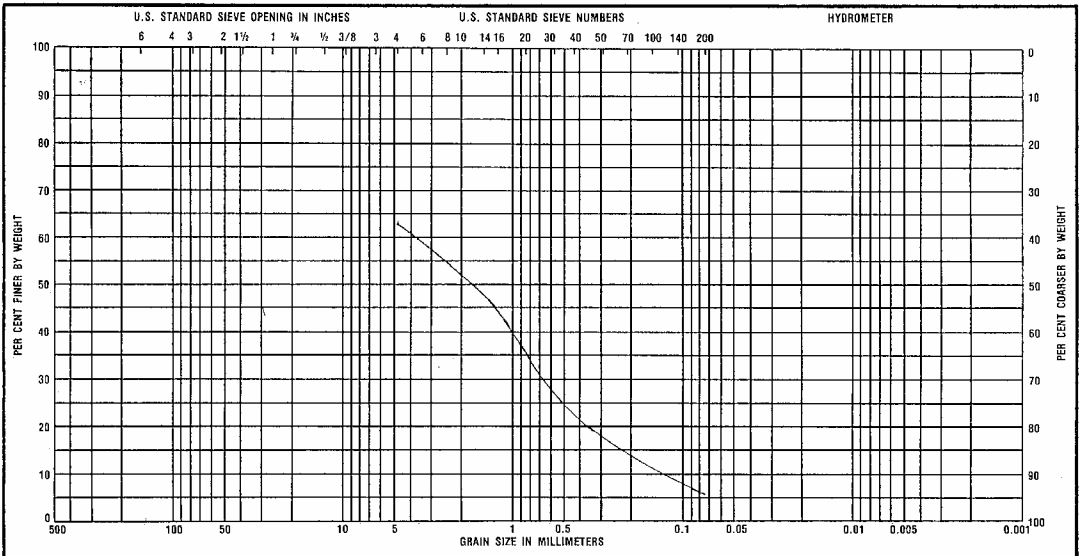
GRAIN SIZE DISTRIBUTION CURVE



COBBLES	GRAVEL	SAND	SILT OR CLAY

Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
SB-2M		4.5-6'	Brown Sandy Silty Clay					Monon Bay S5452
								Date

GRAIN SIZE DISTRIBUTION CURVE



Boring No.	Sample No.	Elev. or Depth	Classification	Nat w %	LL	PL	PI	Project
SB-1H		2-4'	Medium to Coarse Sand and Gravel					Honey Creek Bay S5452
								Date

GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soils unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140-pound hammer falling 30 inches on a 2 inch O.D. split-spoon

Qu: Unconfined Compressive Strength, TSF

Qp: Penetrometer value, unconfined compressive strength, TSF

Mc: Water content, %

LL: Liquid Limit, %

Pl: Plastic Limit, %

Dd: Natural Dry Density, PCF

 : Apparent groundwater level at time noted after completion

DRILLING AND SAMPLING SYMBOLS

SS: Split-spoon - 1 3/8" I.D., 2" O.D., except where noted
ST: Shelby-tube - 3" O.D., except where noted
AU: Auger sample
DB: Diamond bit
CB: Carbide bit
WS: Washed Sample

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

TERM (NON-COHESIVE SOILS)	BLOWS PER FOOT
Very loose	0 - 4
Loose	5 - 10
Firm	11 - 30
Dense	31 - 50
Very dense	Over 50

TERM (COHESIVE SOILS)	Qu (TSF)
Very soft	0 - 0.25
Soft	0.25 - 0.50
Medium	0.50 - 1.00
Stiff	1.00 - 2.00
Very stiff	2.00 - 4.00
Hard	4.00 +

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6mm	Silt	0.74mm-0.005mm
Cobbles	8 in.-3in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.74mm		

APPENDIX "E"

SECTION 401 PERMIT INFORMATION

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live

Evan Bayh
Governor
Kathy Prosser
Commissioner

100 North Senate Avenue
P.O. Box 6015
Indianapolis, Indiana 46206-6015
Telephone 317-232-8603
Environmental Helpline 1-800-451-6027

June 13, 1996

VIA CERTIFIED MAIL P 579 451 045

Colonel Ralph Grieco
U.S. Army Corps of Engineers, Louisville District
P.O. Box 59
Louisville, Kentucky 40201-0059

Attention: Mrs. Rucker

Dear Colonel Grieco:

Re: Section 401 Water Quality Certification
Shafer-Freeman Lakes Env. Cons. Corp.
Public Notice 199501210
White County

Office of Water Management staff have reviewed Public Notice 199501210 dated April 22, 1996, regarding the addition of five disposal sites for spoil material from the proposed Lake Shafer dredging project. The engineering plans attached to the public notice indicate that the spoil material would be placed and contained to comply with all aspects of 327 Indiana Administrative Code 15-5. The Corps of Engineers has not assumed jurisdiction over any of the disposal sites as Waters of the United States.

Based on the available information, it is the judgment of this office that the proposed project will not cause a significant impact to water quality provided that conditions set forth by the State are incorporated into the project. Therefore, subject to the following conditions, the Indiana Department of Environmental Management (IDEM) hereby grants Section 401 Water Quality Certification:

1. All conditions attached to the Section 401 Water Quality Certification granted by IDEM on October 18, 1995, for the dredging and disposal activities described in Public Notice 199501210 dated August 29, 1995, shall apply to the modifications described in Public Notice 199501210 dated April 22, 1996.

This certification is effective 18 days from the mailing of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 18 day period. If a petition for review and a petition for stay of effectiveness are filed within this period, any part of the permit within the scope of the petition for stay is stayed for 15 days, unless or until an Environmental Law Judge further stays the permit in whole or in part.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

1. You must petition for review in a writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.

2. You must file the petition for review with the Office of Environmental Adjudication (OEA) at the following address:

   Office of Environmental Adjudication
   ISTA Building
   150 West Market Street
   Suite 618
   Indianapolis, IN 46204

3. You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day that the OEA offices are closed during regular business hours, you may file the petition the next day that the OEA offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to OEA; the date that the envelope containing the petition is postmarked if it is mailed by United States mail; or, the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Identifying the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, or date of this notice will expedite review of the petition.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, the petitioner will, and any other person may, obtain notice of any prehearing conferences, preliminary hearings, hearings, stays, and any orders disposing of the proceedings by requesting copies of such notices from OEA.

Granting of Section 401 Water Quality Certification does not relieve the applicant from the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from IDEM or any other agency or person.

If you have any questions about this certification, please contact Heidi Kuehne of my staff at 317/233-2473, or you may contact OWM through the IDEM Environmental Helpline (1-800-451-6027).

If you have procedural questions regarding filing a petition for review you may contact OEA at 317-232-8591.

Sincerely,

R.J. Henley
Assistant Commissioner
Office of Water Management

cc: Ms. Louise Clemency, USEPA
Mr. David Hudak, USFWS
Mr. Steve Jose, IDNR
Mr. Robert E. Coates, Shafer-Freeman Lakes Environmental Conservation Corporation **VIA CERTIFIED MAIL**
Mr. Steve W. Chafin, Commonwealth Engineers, Inc. **VIA CERTIFIED MAIL**

APPENDIX "F"

SECTION 404 PERMIT INFORMATION

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

January 4, 1996

Operations Division
Regulatory Branch (North)
ID No. 199501210-pmr

Mr. Steve W. Chafin
Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, Indiana 46237

Dear Mr. Chafin:

This is in regard to our Public Notice No. 199501210 which announced the proposal to dredge tributaries to create sediment basins and place riprap material to create rock chutes to prevent silt and sediment from entering Lake Shafer, near Monticello, in White County, Indiana. We have received a letter from the U.S. Fish and Wildlife Service dated December 11, 1995 (copy enclosed).

In accordance with our regulations, you are given the opportunity to resolve or rebut all concerns. Please note that any action taken by you is strictly voluntary and that you are not required to meet with them or submit comments addressing their concerns.

A copy of this letter is being sent to Mr. Robert Coates, Shafer-Freeman Lakes Environmental Conservation Comm., P.O. Box 372, Monticello, Indiana 47960.

If you have any questions concerning this matter, please contact this office by writing to the above address, ATTN: CEORL-OR-FN, or by calling me at (502) 582-5607.

Sincerely,

Patricia M. Rucker
Regulatory Specialist
Regulatory Branch

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
620 South Walker Street
Bloomington, Indiana 47403-2121
(812) 334-4261 FAX 334-4273

IN REPLY REFER TO:

December 11, 1995

Colonel Ralph Grieco
District Engineer
U.S. Army Engineer District
Louisville
P.O. Box 59
Louisville, Kentucky 40201

Dear Colonel Grieco:

The U.S. Fish and Wildlife Service (FWS) has reviewed Public Notice (PN) 199501210 concerning an application by Mr. Bob Coates for a Department of Army permit, pursuant to Section 404 of the Clean Water Act, to dredge portions of Lake Shafer in White County, Indiana.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U.S. Fish and Wildlife Service's Mitigation Policy.

The applicant proposes to dredge 5 embayments of Lake Shafer tributaries and to construct permanent sediment traps at the dredging locations. Dredge spoil would be disposed of at upland sites.

The FWS inspected and reviewed a proposed dredging/sediment trap project on Lake Shafer in March, 1994. Attached is a copy of our letter of April 6, 1994 to the IDNR providing comments and recommendations on the proposed project. Please note that due to a typographic error the last sentence on page 1 is incomplete. It was intended to state that several commercial mussel species were found in Lake Freeman, and that mussels could also be present in Lake Shafer.

The current proposal is reduced from the original plans we reviewed; all of the 5 proposed dredging sites were in the original plans but many other areas originally proposed for dredging are not in the PN. Only 2 of the proposed sediment traps (Honey Creek and Hoagland Bay) were in the original proposal, but extensive dredging was proposed at the other 3 sediment trap sites (Big Monon Bay and Keans Bay). Two other original sediment trap sites (Carnahan Ditch and intermittent stream northeast of Big Monon Ditch) are not in the PN; the FWS had stated concerns about both sites. Some of the dredge spoil disposal locations have also been changed. Elizabeth McCloskey of our Northern Indiana suboffice inspected most of the revised disposal sites earlier this year.

Based on the aforementioned information the FWS has no objections to the proposed dredging locations and disposal sites. Please refer to our previous review letter

for recommendations concerning dredging and disposal methods, disposal sites, and the 2 aforementioned sediment trap sites. We continue to recommend that the applicant investigate watershed treatment applications to reduce the sediment load from tributary streams.

Endangered Species

The proposed project is within the range of the Federally endangered Indiana bat (Myotis sodalis) and clubshell mussel (Pleurobema clava), and federally threatened bald eagle (Haliaeetus leucocephalus). While some Indiana bat foraging habitat may exist in the project area, the proposed project is not likely to adversely affect these listed species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. If, however, new information on endangered species at the site becomes available or if project plans are changed significantly, please contact our office for further consultation.

Concerning protection of the 3 federal "species of concern" (formerly candidate species) referred to in our previous letter, we do not anticipate adverse impacts from dredging at the 5 proposed sites if the major dredging method is hydraulic dredging as described in the PN. If additional dredging is proposed in the lake basin, especially near the main river channel, it is imperative that hydraulic dredging be used to minimize the suspended sediment load which will flow downstream to the mussel bed below the dam. These 3 species are also listed by the State of Indiana (the snuffbox is endangered, while the rayed bean and purple lilliput are "special concern"); the IDNR should be consulted regarding conservation of mussels.

Please provide a copy of the permit conditions to this office. For further discussion please call Mike Litwin at (812) 334-4261 ext. 205.

Sincerely yours,

Michael A. Litwin acting

David C. Hudak
Supervisor

cc: U.S. EPA Region V, Aquatic Resources Section, WQW-16J, Chicago, IL
Director, Indiana Division of Fish & Wildlife, Indianapolis, IN
Steve Jose, Indiana Division of Fish and Wildlife, Indianapolis, IN
IDEM, Division of Water Management, Indianapolis, IN
U.S. Senator Richard Lugar, Indianapolis, IN Attn: Lane Ralph

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BLOOMINGTON FIELD OFFICE (ES)
620 South Walker Street
Bloomington, Indiana 47403-2121
(812) 334-4261 FAX 334-4273

IN REPLY REFER TO:

April 6, 1994

Mr. Michael Massonne
Indiana Department of Natural Resources
Division of Soil Conservation
402 West Washington Street, Room W265
Indianapolis, Indiana 46204-2748

Dear Mr. Massonne:

The U.S. Fish and Wildlife Service has reviewed the Draft Lake Shafer Feasibility Study for a project to correct sedimentation problems at Lake Shafer in White County, Indiana.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

The proposed project contains several features. Major actions include dredging of Lake Shafer, disposal of dredge spoil, and construction of sediment traps on tributary streams. Several other structural and non-structural measures are referred to but not discussed in detail. The Indiana Department of Natural Resources (IDNR) has provided partial funding for the feasibility study, and may also provide funding for construction of sediment traps. In this letter we will discuss fish and wildlife resources in the study area and address potential environmental impacts of each project feature.

Fish and Wildlife Resources

Lake Shafer is located on the Tippecanoe River. The Tippecanoe is currently recognized as one of the most biologically important rivers in Indiana. As a result of recent surveys, individuals or populations of several imperiled species of fish and mussels were identified at several locations, including species on State and/or federal endangered/threatened species lists (Cummings et. al., 1992, Keevin, et. al., 1985). The Tippecanoe River and Lakes Shafer and Freeman also contain a diverse array of more common fishes, including many species of gamefish (Robertson, 1984, Robertson and Braun, 1982). A mussel bed downstream from Norway Dam contains a diverse mussel community, including 3 species which are candidates for federal listing [snuffbox (Epioblasma triquetra), rayed bean (Villosa fabalis), and purple lilliput (Toxolasma lividus)]. The snuffbox population is believed to be one of the largest anywhere and possibly the only viable one in Indiana (Bob Anderson, IDNR Division of Fish and Wildlife, personal communication). The federally-endangered clubshell mussel is present in a mussel bed downstream from Lake Freeman. During the recent drawdown of Lake Freeman, it was noted that commercial mussel species

possible that several species of mussels could be present in Lake Shafer (Bob Anderson, personal communication).

Essential habitat for the mussels and rare fishes consists of large reaches of gravel/rock substrate which are predominantly silt-free. Important habitat for other fishes includes vegetated shallows and natural structural materials such as rocks, woody debris, undercut banks, and exposed tree roots.

Forested riparian areas and wetlands along the banks of the river, lakes, and tributary streams are used by many species of waterfowl, wading birds, furbearers, songbirds, and amphibians. The wildlife habitat value of the open water is limited unless it is complemented by these other habitat types.

Potential Impacts

Dredging

Dredging has the potential to resuspend large quantities of sediment. Under the wrong conditions (e.g. high river flows) such sediment could wash downstream, producing potentially large adverse impacts on mussel beds and fish habitat. Heavy sediment loads can smother mussel and fish eggs, impair adult mussels, and degrade habitat quality. In healthy streams, flushing flows remove sediments from high-quality substrates. At the project site, Lake Shafer has prevented normal flow regimes, but has also protected downstream areas from heavy sediment loads.

Ideally, dredging should be conducted only by hydraulic methods. Hydraulic dredging results in considerably less sediment resuspension than mechanical dredging. Also, dredging should be conducted during periods of no-flow or minimal flow, to reduce downstream transport of sediment. The extent of dredging should be limited to priority areas for boat passage and access, and sediment traps. Dredging near shorelines eliminates shallow water habitat for fish, and should therefore be limited to areas where maintenance of boat access is required for exisiting facilities. It is essential to leave a significant portion of unaltered shallow shoreline habitat for maintenance of optimal fish communities. Additionally, dredging to produce relatively steep shoreline contours will result in unstable banks in some areas, with accompanying increase in erosion potential.

Lake drawdown can result in adverse impacts under the wrong conditions. Extended drawdown during periods of heavy rain can cause erosion of exposed bare soil areas, resulting in increased downstream sediment load. Rapid drawdown can cause the loss of fish from the reservoir, and can produce excessive scouring downstream. Sudden, large increases in stream flow should be avoided during fish spawning season.

Storage and Disposal of Dredged Material.

Dredged material that is not properly contained during dewatering may erode back into the lake, thus increasing downstream sediment load. All dredged material should be properly contained by berms during dewatering, and should be permanently disposed of in contained areas.

Disposal of dredged material in wetlands, forested riparian areas, or other high-quality habitats should be avoided. Disposal in wetlands or other waters would require a permit from the U.S. Army Corps of Engineers, pursuant to Section 404 of the Clean Water Act. Disposal in forested riparian areas, with associated loss of woody vegetation, eliminates significant wildlife habitat, reduces the ability of

the riparian vegetation to buffer the lake from pollutants carried by surface water runoff, and increases the potential for shoreline erosion.

Sediment Traps.

Sediment traps are theoretically a useful measure to control sediment runoff to a stream or lake when the source of the sediment can not be directly addressed and corrected. In practice, the design and location of sediment traps will determine their efficiency at reducing sediment load and environmental impacts.

Traps should not be located in areas of good gravel/rock substrate within a stream channel; such areas may contain mussel beds and/or significant fish-spawning habitat. Traps also should not be located in vegetated wetlands or other high-quality habitats where construction or equipment access would degrade those habitats.

Traps should be designed to fit the size and flow of the affected stream. Location at a constriction is often preferred; deflectors may be necessary to reduce stream flow at the site of the trap. Temporary sediment traps can be designed to function as fish pools after their sediment function is completed.

Other Non-structural Actions (Page 54)

The suggested discharge of sediment-laden flood waters directly downstream via turbine bypass at the hydroelectric facility would only result in passing the problem downstream to other lake and river reaches. This measure could have substantial adverse impacts on downstream mussel beds, including the aforementioned federally-endangered species, therefore, such an approach would be unacceptable to our agency.

Endangered Species

The only federally-listed species, other than the aforementioned clubshell mussel, that could potentially be affected by the proposed project would be the Indiana bat (Myotis sodalis). Impacts would be likely to occur only if tree-clearing occurs along relatively undisturbed portions of forested waterways.

Recommendations

Dredging

1. Use only hydraulic dredging and avoid extensive or prolonged drawdowns of the lake.

2. Limit dredging to only areas necessary to provide adequate passage for boats. Avoid dredging in vegetated shallows, and in general limit dredging in shallow areas along the shoreline to areas necessary for boat access to exisiting facilities.

3. Areas to be dredged in the Tippecanoe River channel should first be surveyed for mussels. Additional coordination may be necessary depending on the results of such surveys.

4. It may be necessary to test sediments for contaminants if previous history at any of the dredging sites warrants concern about contamination by pollutants.

Disposal of Dredged Material

We submit the following site-specific recommendations about the candidate disposal sites. The sites are referenced on the attached National Wetland Inventory (NWI) map (Attachment A).

1. Honey Creek (Area A on the NWI map). This site appears suitable provided that wetlands are avoided and the material is adequately contained. Ditch work and other disturbance have degraded the quality of the stream and riparian area at this location.

2. Hoagland Bay (Area B). This site is a steep, wooded ravine connected to the lakeshore (Photo 1). Disposal here would eliminate forested riparian habitat and would create a potential erosion problem. A Section 404 permit would be required for the portion below Ordinary High Water. We recommend against use of this site.

3. McKillip Ditch (Site C). We were not able to inspect this site. It was described as an open area separated from the stream. It should be suitable provided that impacts to the forested wetland shown on the NWI map are avoided.

4. Big Monon Ditch (Sites D and E). Several riparian wetlands are located at these sites, as shown on the NWI map. The pastured areas landward of the wetlands would be acceptable disposal sites.

5. Site F. This site is located in a successional field. The field contains wetlands, mostly associated with a small ditch. The NWI map shows a palustrine, scrub-shrub (PSS1C) wetland near the site. A wetland delineation may be necessary here to identify and avoid jurisdictional wetlands.

Sediment Traps

The Feasibility Study states (Page 51) that the proposed sediment traps will control sedimentation from only about 6.8% of the total watershed, and that about 68% of the total drainage area will continue to be a potential sediment source for the lake. Therefore, the use of sediment traps as a main sediment control measure wil have to be supplemented by regular maintenance dredging.

Since the feasibility study addressed only existing sedimentation of the lake and did not provide quantitative data about current sediment transport of tributary streams, it has not been established that the proposed sediment traps would address the major sediment sources in the watershed. We recommend that a study of sediment transport be conducted before attempting to determine where the most appropriate locations for sediment traps would be.

Regarding the trap locations that are currently proposed, we submit the following comments concerning environmental impacts.

Honey Creek. Most of this site has already been disturbed by residential/commercial development. It would be a suitable site for a trap, provided that there are no modifications or disturbances to the forested riparian corridor that begins at the upstream end of the site.

Hoagland Bay. This site has also been disturbed by residential development and is already wide and deep. It appears suitable for a sediment trap.

Carnahan Ditch. Channel depth at this site has been considerably reduced by sedimentation. The stream flow is spread out over a relatively wide area, which contains emergent and woody vegetation and is now functioning as a riparian wetland. The site is probabaly used by a variety of wildlife (Photo 2). It may be necessary to excavate sediment) out of the main channel, but we recommend that a sediment trap not be placed here because of the extent to which it would disrupt wildlife habitat. Possibly a trap could be constructed upstream at a site which would result in less impacts to wildlife habitat.

Mouth of intermittent stream northeast of Big Monon Ditch. The designated site did not appear to be approprite for a sediment trap. It is a wide expanse of open water with wooded shoreline. Further upstream, this drainageway contains wetlands which should not be disturbed.

Conclusions

We strongly encourage the project sponsors to consider a watershed study to supplement the proposed dredging and sediment traps. Once major sediment sources have been identified, great benefit can be derived from measures such as grassed waterways, small retention basins, restored wetlands (including forested riparian wetlands), and conservation tillage practices. These measures may considerably reduce the need for maintenance dredging and maintenance of sediment traps. It would be necessary to work with landowners to implement such practices, but there are several incentive and financial assistance programs which could be brought into play. The new federal Wetland Reserve Program pays landowners to restore and retire wetlands to a permanent easement. The U.S. Soil Conservation Service and Environmental Protection Agency both provide cost sharing for some practices. Our agency will restore wetlands at no expense to the landowner. Forest Clark of our office has provided an information package on these programs to Robert Coats of the Shafer and Freeman Lakes Environmental Conservation Corporation.

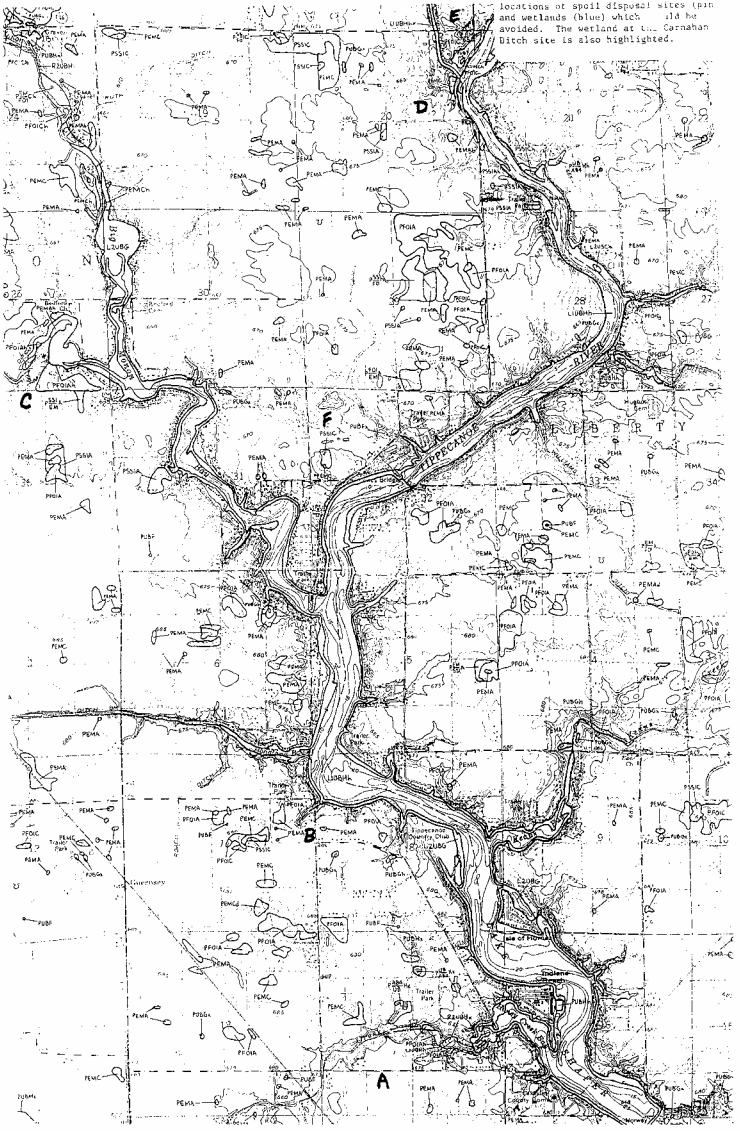
For further discussion, please contact Mike Litwin at (812) 334-4261, ext. 205.

Sincerely yours,

David C. Hudak

David C. Hudak
Supervisor

cc: Director, Indiana Division of Fish & Wildlife, Indianapolis, IN
Steve Jose, Indiana Division of Fish and Wildlife, Indianapolis, IN
IDEM, Division Water Management, Indianapolis, IN
Senator Richard Lugar, Indianapolis,IN Attn: Lane Ralph
Mr. Bob Coates, SFLECC, P.O. Box 372, Monticello, IN 47960
Regional Director, FWS, Twin Cities, MN (ES-TE)


locations of spoil disposal sites (pin
and wetlands (blue) which ld be
avoided. The wetland at t... Carnahan
Ditch site is also highlighted.
A
B
C
D
E
F
TIPPECANOE
RIVER
LIBERTY

Department of the Army
U. S. Army Engineer District, Louisville
Corps of Engineers
P. O. Box 59
Louisville, Kentucky 40201-0059

FIRST-CLASS MAIL
U. S. POSTAGE
PAID
Louisville, KY
Permit No. 43

01

SPC 00220
MR STEVE W CHAFIN
7256 COMPANY DR.
COMMONWEALTH ENG. INC.
INDIANAPOLIS, IN 46237

Public Notice

Public Notice No.	Date:	Closing Date:
199501210	04/22/96	05/02/96

US Army Corps of Engineers
Louisville District

Please address all comments and inquiries to:
U.S. Army Corps of Engineers, Louisville District
ATTN: Mrs. Rucker, CEORL-OP-FN
P.O. Box 59
Louisville, Kentucky 40201-0059
Phone: (502) 582-5607

This notice announces an application submitted for a revision to Department of the Army (DA) Permit Application No. 199501210. This revision request is subject to Section 404 of the Clean Water Act (CWA).

APPLICANT: Mr. Robert E. Coates
Shafer-Freeman Lakes Environmental Conservation Corp.
P.O. Box 372
Monticello, Indiana 47960

AGENT: Mr. Steve W. Chafin
Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, Indiana 46237

LOCATION: Keans Bay area, North Bedford Bay area, McKillip Ditch area, and Hoagland Bay area (3 sites), at Lake Shafer, near Monticello, in White County, Indiana.

PURPOSE: To add five (5) additional disposal sites for spoil material from the proposed Lake Shafer dredging project.

DESCRIPTION OF WORK: The Sparks property near Keans Bay is approximately 11.2 acres and would have a capacity of 23,600 cubic yards (cys) of dredged material. The Clerget three (3) properties near Hoagland Bay are 24.5 acres with a capacity of 18,600 cys, 4.5 acres with a capacity of 3,500 cys, and 21.0 acres with a capacity of 15,900 cys. The Farris property near McKillip Ditch is 23 acres with a capacity of approximately 34,270 cys; and the property near North Bedford Bay is 30 acres with a capacity of 96,300 cys. The dredged material would be contained at the disposal sites using straw bale dams, earthen berms, and silt fencing.

REVIEW PROCEDURES: A DA Permit modification cannot be issued if any legally required Federal, State, or local authorization or certification is denied. A DA permit, if otherwise warranted, will not be issued until a Water Quality Certification or waiver is on file in this office. The applicant has obtained certification from the Indiana Department of Environmental Management on the originally announced proposal. A certification or waiver from the Indiana Department of Environmental Management would be necessary for this revision.

Copies of this notice are sent to the appropriate Federal and State Fish and Wildlife Services. Their views and comments are solicited in accordance with the Fish and Wildlife Coordination Act of 1956. Based on available information, the proposed activity will not destroy or endanger any Federally-listed threatened or endangered species or their critical habitats, as identified under the Endangered Species Act, and therefore, initiation of formal consultation procedures with the U.S. Fish and Wildlife Service is not planned at this time.

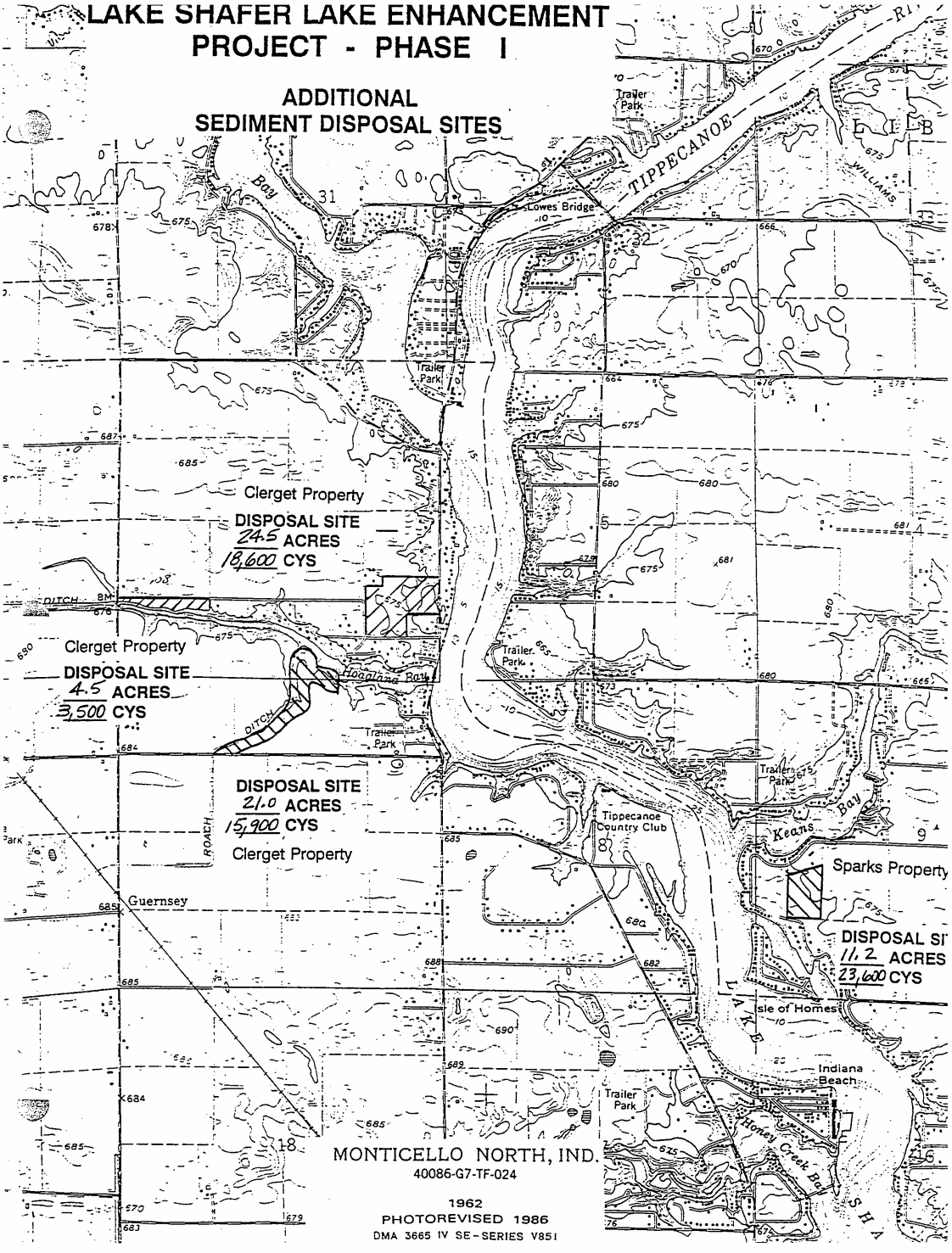
Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this

Operations and Readiness Division
Regulatory Branch (North)
ID No. 199501210

Information pertaining to this application is available for public examination during normal business hours upon prior request. All comments regarding this proposal should be addressed to Mrs. Rucker, CEORL-OP-FN at the address noted above and should refer to the Public Notice Number 199501210.

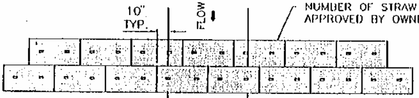
LAKE SHAFER LAKE ENHANCEMENT PROJECT - PHASE I

ADDITIONAL SEDIMENT DISPOSAL SITES



MONTICELLO NORTH, IND.
40086-G7-TF-024

1962
PHOTOREVISED 1986
DMA 3665 IV SE-SERIES V851

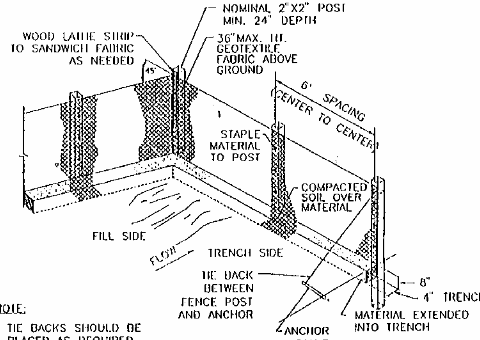


TYPICAL PLAN VIEW

THE CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH ALL ASPECTS OF 327 IAC 15-5. "STORM WATER RUN-OFF ASSOCIATED WITH CONSTRUCTION ACTIVITY".

ELEVATION VIEW

STRAW BALE DAM
N.T.S.



NOTE:

TIE BACKS SHOULD BE PLACED AS REQUIRED.

SILT FENCE DETAIL
N.T.S.

GENERAL NOTES

1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS ARE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCES.

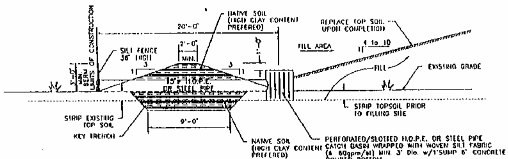
3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY.

4.) CONTRACTOR WILL BE RESPOSIBLE FOR FINAL GRADING OF DISPOSAL SITE.

5.) CONTRACTOR TO CLEAR AND GRUB ALL TREES WITHIN THE LIMITS OF CONSTRUCTION.

6.) WITHIN LIMITS OF CONSTRUCTION CONTRACTOR TO STRIP AND STOCK PILE TOP SOILPRIOR TO PLACEMENT OF DISPOSED MATERIAL. PRIOR TO FINAL GRADING OF SITE. FILLED AREA SHALL BE COVERED WITH 6" OF TOP SOIL.

SEDIMENT DISPOSAL LOCATION MAP



TEMPORARY BERM AND FILL SECTION

COMMONWEALTH ENGINEERS, INC.	DATE: AUG. 1995 SCALE: AS NOTED	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS STANDARD DETAILS

COMMONWEALTH ENGINEERS, INC.

March 22, 1996

U.S. Army Corps of Engineers
Louisville District
P.O. Box 59
Louisville, KY 40201-0059

Attn: Ms. Pat Rucker (502) 582.5607

Re: **SFLECC; LAKE SHAFER ENHANCEMENT PROJECT**
ID No. 199501210-pmr

Dear Ms. Rucker:

We are transmitting two (2) additional sediment disposal site maps for the following areas for your approval:

1. Sparks Property for - Keans Bay Area
2. Lois Farris Property for - North Bedford Bay Area
3. Lois Farris Property for - McKillip Ditch Area
4. Clerget Property for - Hoagland Bay Area (3 Sites)

We will want to include these with the approval of the original submittal. Thank you.

Sincerely,

COMMONWEALTH ENGINEERS, INC.

Roger M. Kottlowski

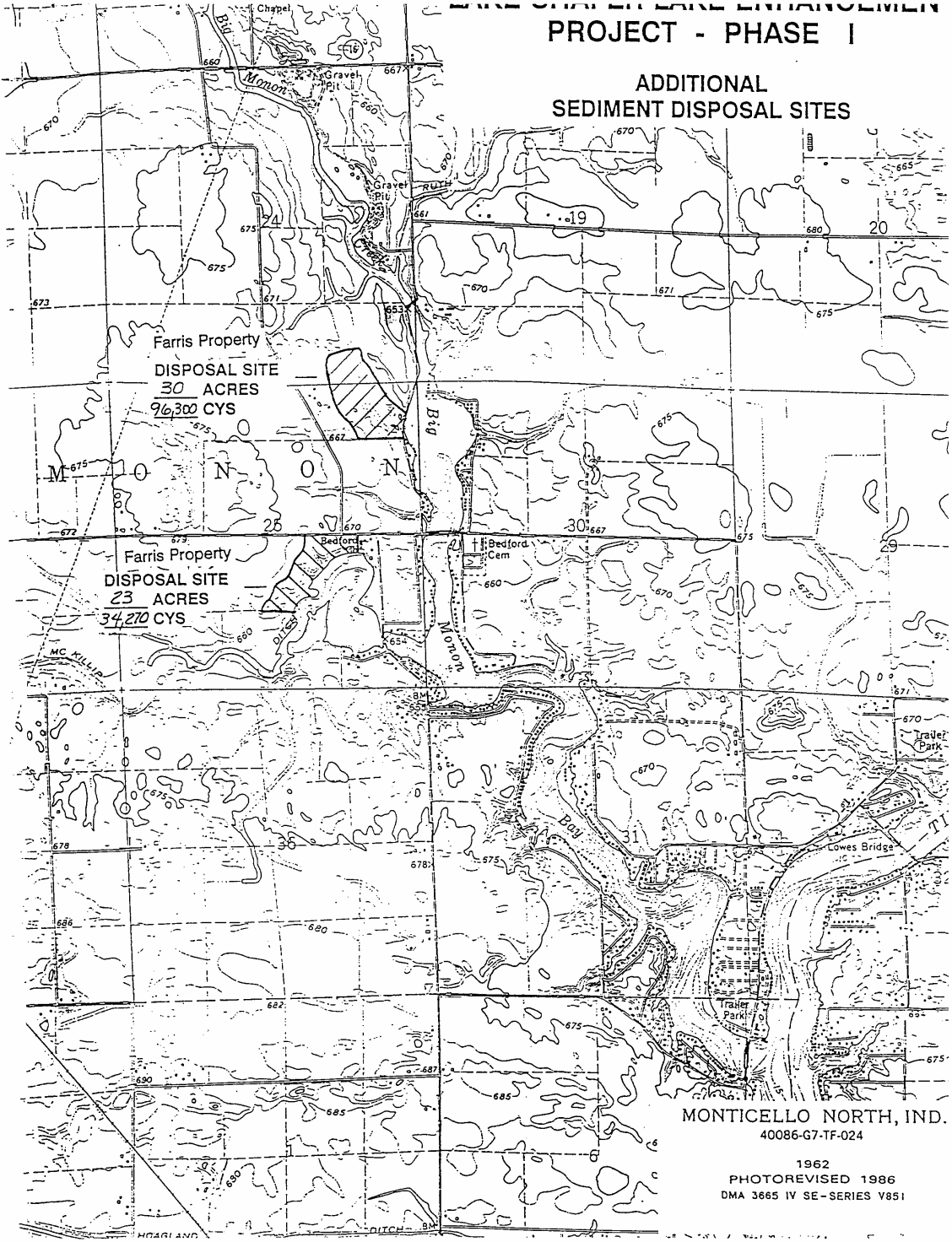
Roger M. Kottlowski, P.E.
Project Engineer

cc: Mr. Armand Coppe, President, SFLECC
Mr. Robert Coates, SFLECC
C9588/Chron.
Enclosures

7256 Company Drive
Indianapolis, Indiana 46237
(317) 888-1177
FAX (317) 887-8641

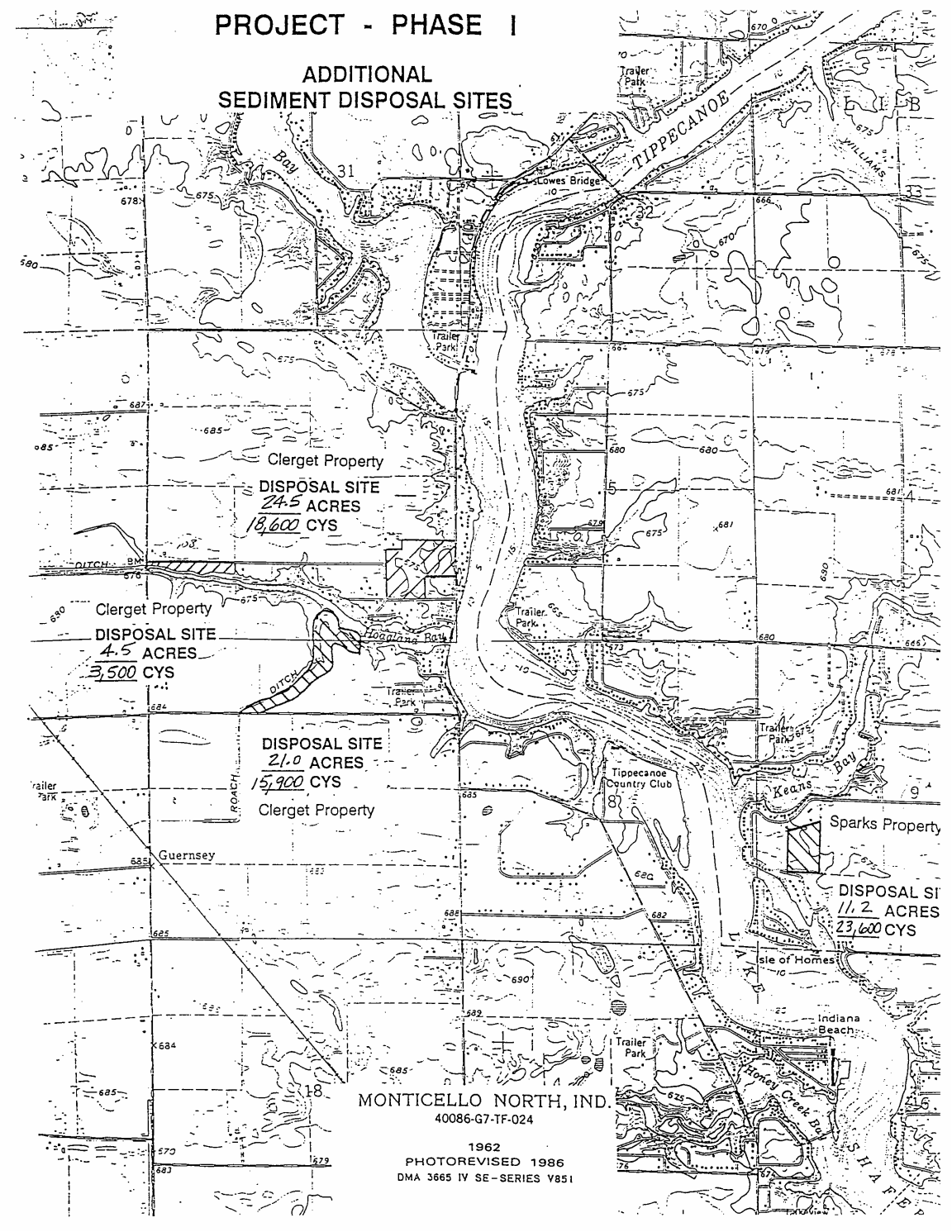
LAKE SHAFER LAKE ENHANCEMENT PROJECT - PHASE I

ADDITIONAL SEDIMENT DISPOSAL SITES



PROJECT - PHASE I

ADDITIONAL SEDIMENT DISPOSAL SITES



Department of the Army
U. S. Army Engineer District, Louisville
Corps of Engineers
P. O. Box 59
Louisville, Kentucky 40201-0059

FIRST-CLASS MAIL
U. S. POSTAGE
PAID
Louisville, KY
Permit No. 43

01

SPC 00220
MR STEVE W CHAFIN
7256 COMPANY DR.
COMMONWEALTH ENG. INC.
INDIANAPOLIS, IN 46237

Public Notice

Public Notice No.	Date:	Closing Date:
199501210	11/20/95	12/08/95

US Army Corps of Engineers
Louisville District

Please address all comments and inquiries to:
U.S. Army Corps of Engineers, Louisville District
ATTN: Mrs. Rucker, CEORL-OP-FN
P.O. Box 59
Louisville, Kentucky 40201-0059
Phone: (502) 582-5607

This notice announces an application submitted for a Department of the Army (DA) Permit, subject to Section 404 of the Clean Water Act (CWA).

APPLICANT: Mr. Robert E. Coates
Shafer-Freeman Lakes Environmental Conservation Comm.
P.O. Box 372
Monticello, Indiana 47960

AGENT: Mr. Steve W. Chafin
Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, Indiana 46237

LOCATION: Shafer Lake (Area #1, Honey Creek Bay; Area #2, Hoagland Bay; Area #3, Little Monon Bay; Area #4, North Bedford Bay; and, Area #5, Keans Bay), near Monticello, in White County, Indiana.

PURPOSE: The applicant's stated purpose is to create sediment basins which would prevent silt and sediment being carried down the tributaries from entering Lake Shafer, lessening the amount of sedimentation which is occurring in the Lake.

DESCRIPTION OF WORK: The applicant proposes to dredge five (5) embayment areas of the lake in order to increase the depth and to create sediment basins. Geotextile filter fabric and hand laid riprap would be installed at the upstream end of each sediment basin as a rock chute and at the downstream end of each basin to protect a berm of native earth to function as a submerged weir. The total quantity of riprap is approximately 2,900 cubic yards (cys) and is for erosion control only. The majority of the dredging would be performed using a hydraulic dredge; however, some dredging may be performed with land based equipment such as an extend-a-hoe. The dredged material would be disposed of at various disposal sites near the lake. Some dredged material would be temporarily stockpiled on-site prior to being transported to the disposal sites. The sediment basins would need to be cleaned out periodically; therefore, a 10-year maintenance dredging permit is proposed.

Area #1 - Honey Creek Bay, approximately 11,200 cys of material would be dredged and approximately 8,000 cys would be temporarily stockpiled on the existing peninsula/parking lot then moved to a disposal site. The remainder of the material would be transported directly to a disposal site.

Area #2 - Hoagland Bay, approximately 18,600 cys of material would be dredged and transported directly to disposal sites. There is a 0.16 acre jurisdictional wetland within the dredging area which will be lost. There was no mitigation proposed for the loss.

Area #3 - Little Monon Bay, approximately 34,270 cys of material would be dredged and hauled to a disposal site. Approximately 520 lineal feet of bank along McKillip Creek, which feeds into the bay, would be stabilized with approximately 109 cys of riprap and 36 cys of bedding material on filter fabric.

Area #4 - North Bedford Bay, approximately 140,600 cys of material would dredged from this site. The material would be transported directly to a disposal area.

Area #5 - Keans Bay, approximately 23,600 cys of material would be dredged. The material would not be stockpiled on site, it would be transported directly to a disposal site. The channel sediment basin would be constructed using a steel sheet piling cutoff wall which would extend from bank to bank in order to protect the bridge piers. The cutoff wall does not require authorization under the CWA.

The Segal property, designed as a dredged material disposal site, has a fill capacity of approximately 78,200 cys; the Indiana Beach property has a fill capacity of approximately 25,200 cys; the Shafer Freeman Lake Environmental Conservation Committee (SFLECC) property has a fill capacity of approximately 34,500 cys; the Peters property has a fill capacity of approximately 9,300 cys; the property near the Pine View Golf Club has a fill capacity of approximately 90,000 cys; and the site along County Road 225 North at Honey Creek has a fill capacity of approximately 22,000 cys. The dredged material would be contained at the temporary and permanent sites by a straw bale dams, earthen berms, and silt fencing. There is a 2.4-acre jurisdictional wetland in the area of the SFLECC disposal site. The applicant has indicated that no impacts are anticipated in this wetland area. The site along County Road 225 North may contain a 0.05 acre wetland which would be filled. The site is in a farm field currently in production and there is no mitigation proposed.

Honey Creek, at the Indiana Beach disposal site, would be stabilized using approximately 1,760 cys of riprap along 650 lineal feet of bank. Approximately 580 cys of bedding material would be placed on filter fabric.

REVIEW PROCEDURES: A DA Permit cannot be issued if any legally required Federal, State, or local authorization or certification is denied. A DA Permit, if otherwise warranted, will not be issued until a Water Quality Certification or waiver is on file at this office. The applicant has obtained the certification from the Indiana Department of Environmental Management.

Copies of this notice are sent to the appropriate Federal and State Fish and Wildlife Services. Their views and comments are solicited in accordance with the Fish and Wildlife Coordination Act of 1956. Based on available information, the proposed activity will not destroy or endanger any Federally-listed threatened or endangered species or their critical habitats, as identified under the Endangered Species Act, and therefore, initiation of formal consultation procedures with the U.S. Fish and Wildlife Service is not planned at this time.

Operations Division
Regulatory Branch (North)
ID No. 199501210

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. A request for a public hearing must state the specific interest which might be damaged by issuance of the DA Permit.

The National Register of Historic Places has been consulted, and it has been determined that there are no properties currently listed on the Register which would be directly affected by the proposed work. If we are made aware, as a result of comments received in response to this notice, or by other means, of specific archaeological, scientific, prehistorical, or historical sites or structures which might be affected by the proposed work, the District Engineer will immediately take the appropriate action necessary pursuant to the National Historic Preservation Act of 1966 - Public Law 89-665 as amended (including Public Law 96-515).

The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered; among those are conservation, economics, aesthetic values, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use, navigation, recreation, water supply, water quality, energy needs, safety, food production, and in general, the needs and welfare of the people. In addition, the evaluation of the impact of the activity on the public interest will include application of the guidelines (40 CFR Part 230) promulgated by the Administrator, Environmental Protection Agency, under authority of Section 404(b) of the CWA.

The Corps of Engineers is soliciting comments from the public; Federal, State, and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Written statements received in this office on or before the closing date will become a part of the official record and will be considered in the determination on this permit request. Any objections which are received during this period will be forwarded to the applicant for possible resolution before the determination is made whether to issue or deny the requested DA Permit. A permit will be granted unless its issuance is found to be contrary to the public interest.

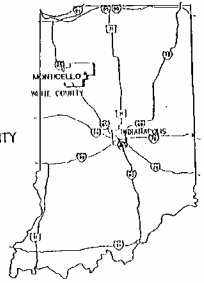
Operations Division
Regulatory Branch (North)
ID No. 199501210

Information pertaining to this application is available for public examination during normal business hours upon prior request. All comments regarding this proposal should be addressed to Mrs. Rucker, CEORL-OP-FN at the address noted above and should refer to the Public Notice Number 199501210.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREAS 1 AND 3 THROUGH 5

AUGUST, 1995

PLAN SHEET INDEX



PROJECT AREA LOCATION

SFLECC
ENVIRONMENTAL CONSERVATION CORPORATION

(219) 583-9784

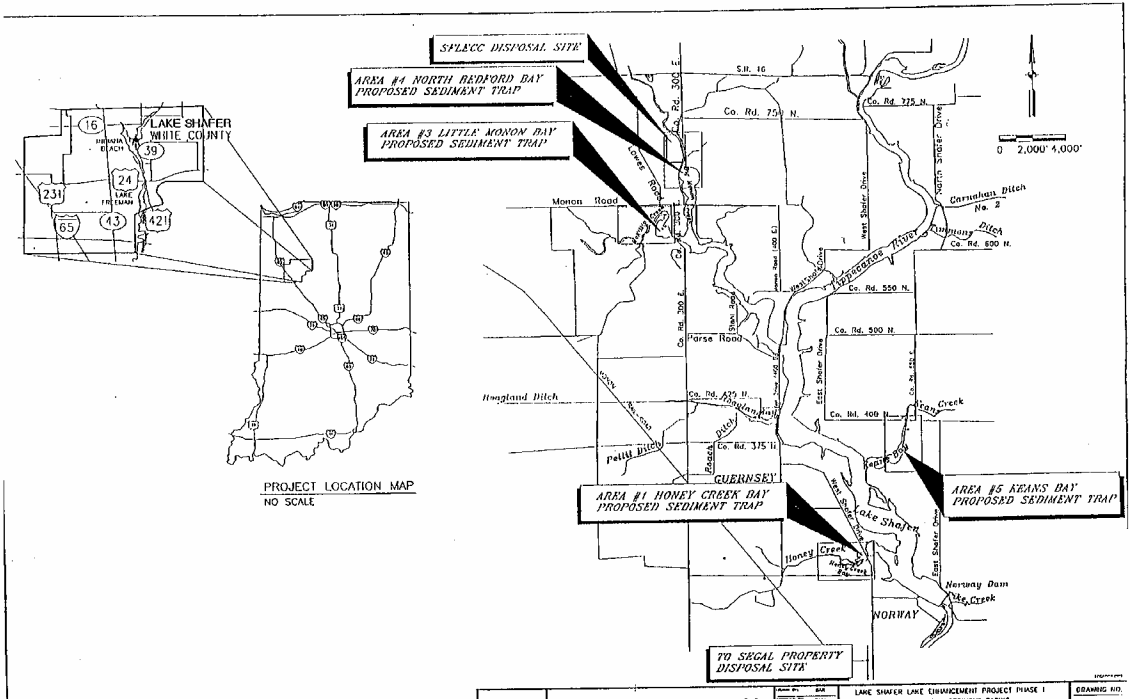
SHAFER AND FREEMAN LAKES ENVIRONMENTAL CONSERVATION CORPORATION

COMMONWEALTH ENGINEERS, INC.

CERTIFIED BY: _____ DATE

G. EDWIN TINKLE II
INDIANA P.E. NO. 6108

PROJECT NO.: C95001

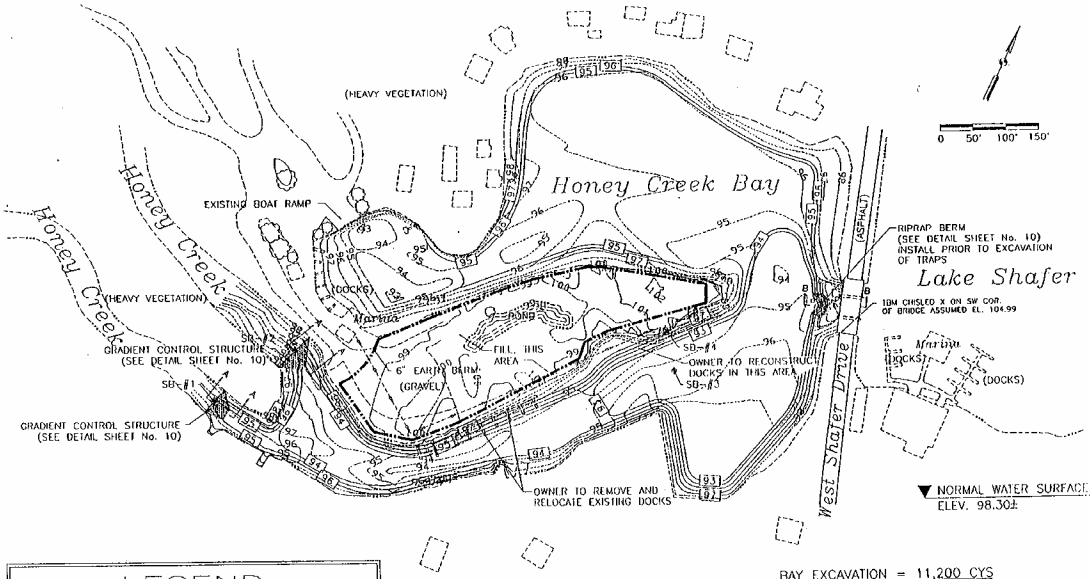


COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREAS 1,3,4 AND 5
PROJECT LOCATION MAP AND DISPOSAL SITES

DRAWING NO. 2

2 of 11



LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- SOIL BORE SAMPLE
- TMP
- EARTH BERM LIMITS
- EXISTING WATERS EDGE
- OVERHEAD POWER LINES
- EXISTING TREE

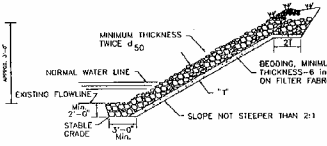
BAY EXCAVATION = 11,200 CYS

PENINSULA FILL VOLUME = 8,000 CYS

COMMONWEALTH ENGINEERS, INC

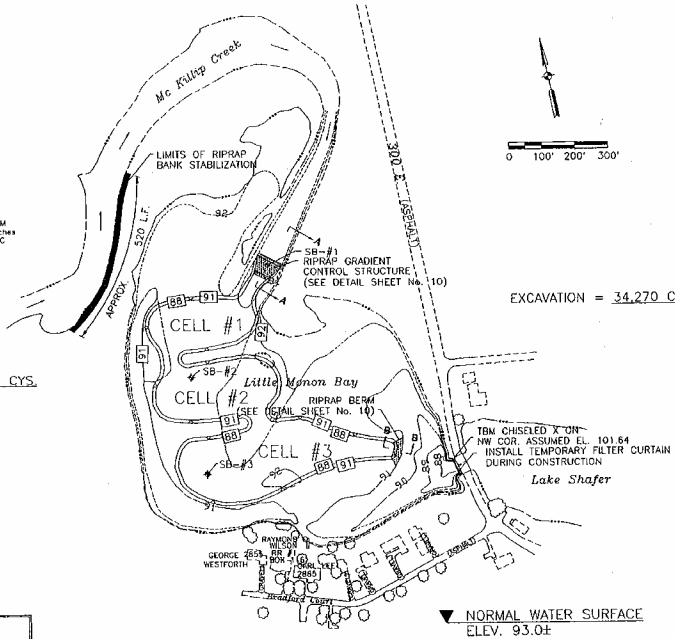
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA #1
HONEY CREEK BAY SE... PLAN

DRAWING NO. 3



RIPRAP CHANNEL STABILIZATION DETAIL

APPROX. RIPRAP BANK STABILIZATION = 145 CYS.



EXCAVATION = 34,270 CYS

LEGEND

(93) PROPOSED CONTOUR	RIPRAP
93 EXISTING CONTOUR	EXISTING WATERS EDGE
SOIL BORE SAMPLE	EXISTING TREE

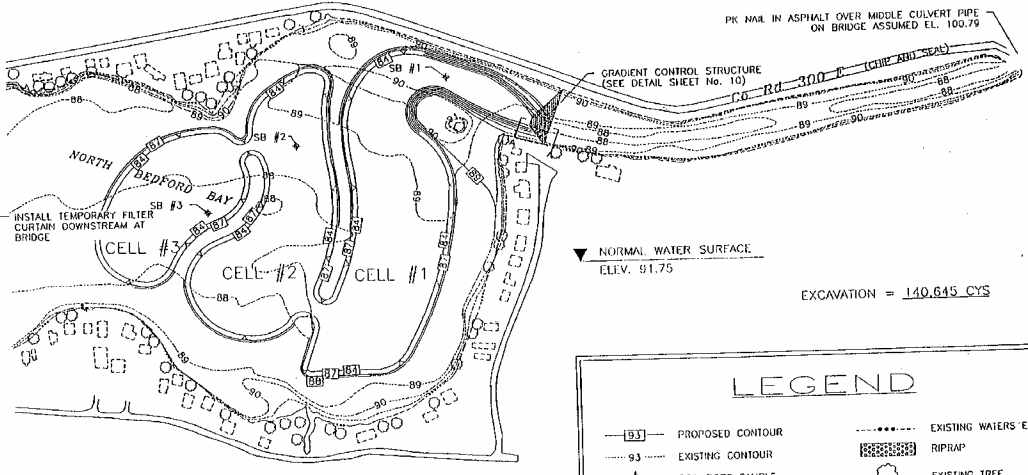
10/15/85 COE REV.

COMMONWEALTH ENGINEERS, INC.

DRAWN BY: BAR/TR	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
CHECKED BY: BWK	TRIBUTARY BAY SEDIMENT BASINS
SURVEY BY:	AREA #3
DATE: AUG. 1985	LITTLE MONON BAY SITE PLAN
JOB NO.: 8515501	
SCALE: 1"=100'	

DRAWING NO. 4

4 OF 11

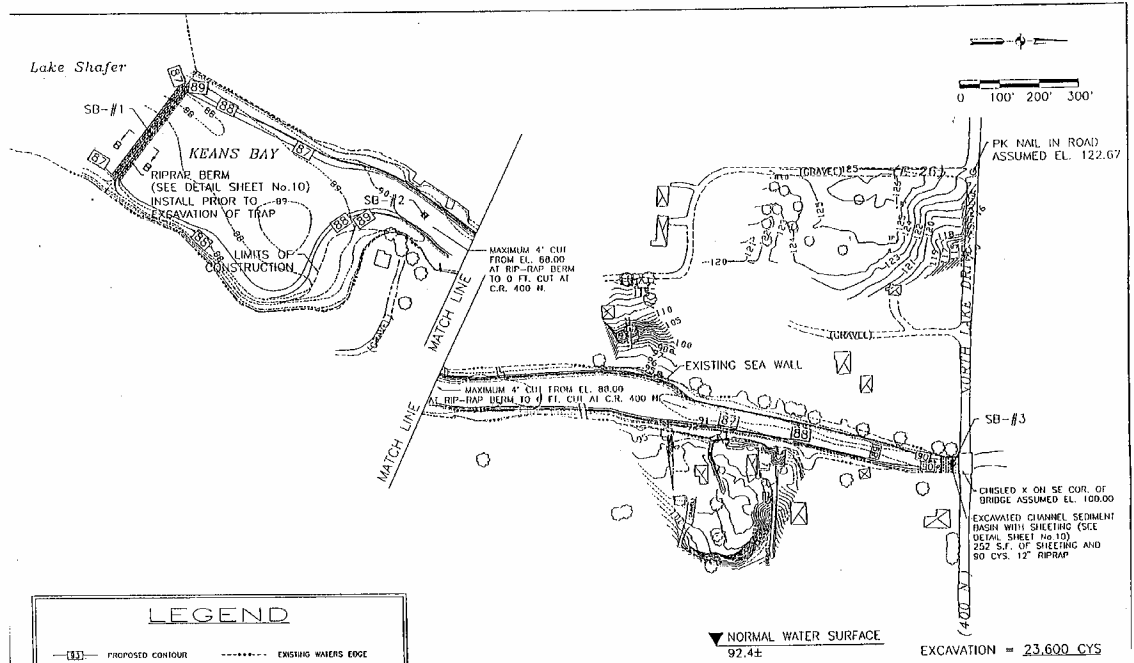


COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE 1
TRIBUTARY BAY SEDIMENT BASINS
AREA #4
NORTH BEDFORD BAY SITE PLAN

DRAWING No. 5

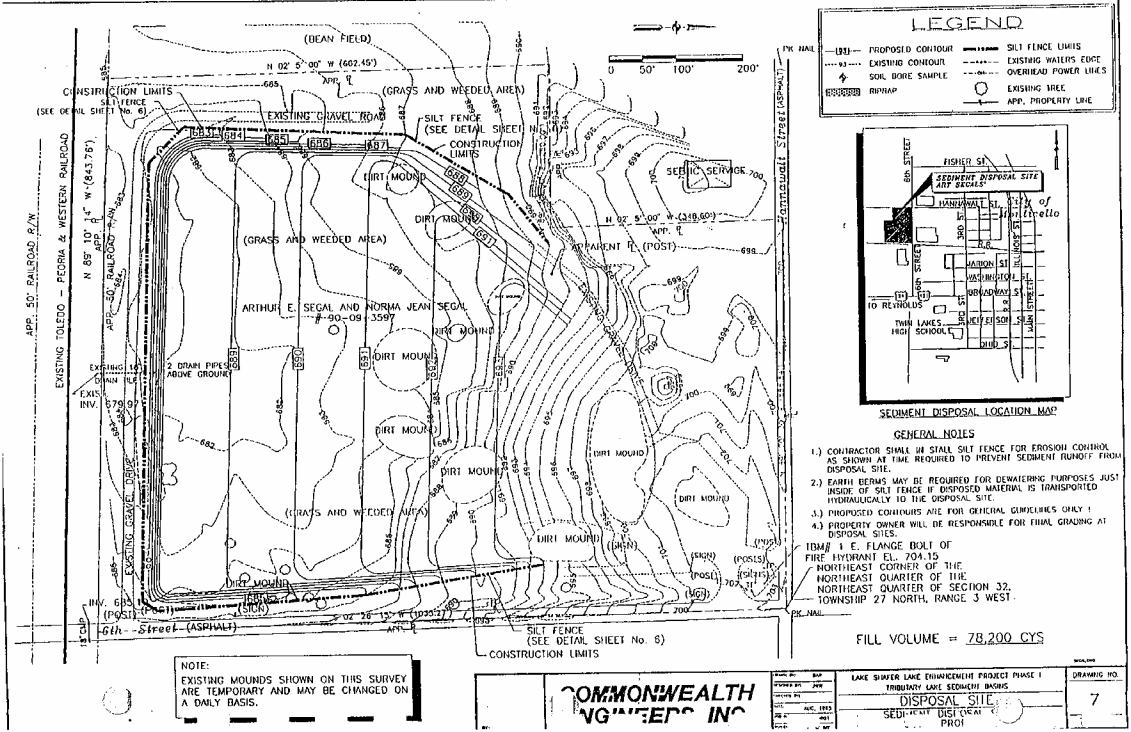
5 of 11

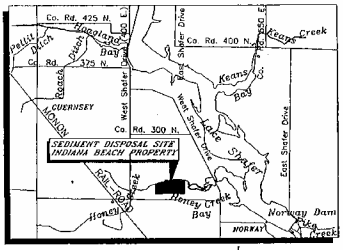


COMMONWEALTH ENGINEERS, INC.

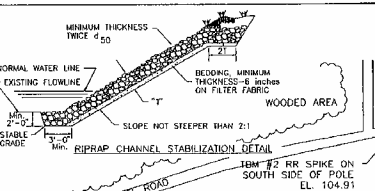
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
MANATEE BAY SEDIMENT BASINS
AREA #5
KEANS BAY SITE PLAN

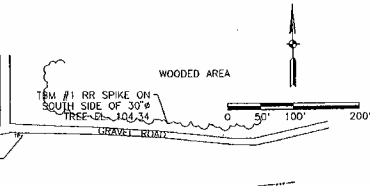
DRAWING NO.
6
6 OF 11

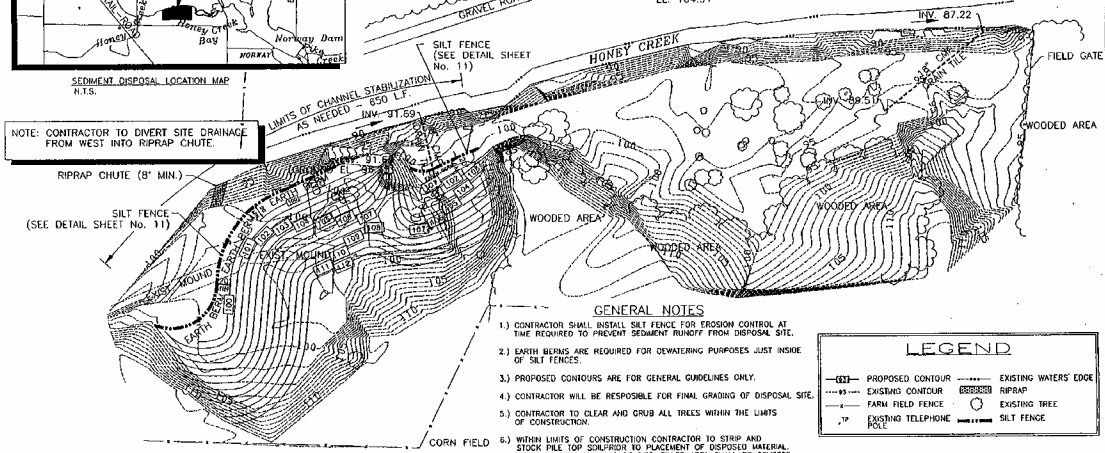

LEGEND
PROPOSED CONTOUR
EXISTING CONTOUR
SOIL BORE SAMPLE
RIPRAP
SILT FENCE LIMITS
EXISTING WATERS EDGE
OVERHEAD POWER LINES
EXISTING TREE
APP. PROPERTY LINE
SEDIMENT DISPOSAL LOCATION MAP
GENERAL NOTES
1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AS SHOWN AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.
2.) EARTH BERMS MAY BE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCE IF DISPOSED MATERIAL IS TRANSPORTED HYDRAULICALLY TO THE DISPOSAL SITE.
3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY !
4.) PROPERTY OWNER WILL BE RESPONSIBLE FOR FINAL GRADING AT DISPOSAL SITES.
TBM: 1 E. FLANGE BOLT OF FIRE HYDRANT EL. 704.15 NORTHEAST CORNER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 32, TOWNSHIP 27 NORTH, RANGE 3 WEST.
FILL VOLUME = 78,200 CYS
NOTE: EXISTING MOUNDS SHOWN ON THIS SURVEY ARE TEMPORARY AND MAY BE CHANGED ON A DAILY BASIS.
(BEAN FIELD)
(GRASS AND WEEDED AREA)
EXISTING GRAVEL ROAD
SILT FENCE (SEE DETAIL SHEET No. 6)
CONSTRUCTION LIMITS
DIRT MOUND
SEPTIC SERVICE
ARTHUR E. SEGAL AND NORMA JEAN SEGAL #-90-09-3597
PARENT R. (POST)
APP. 50' RAILROAD R/W
EXISTING TOLEDO - PEORIA & WESTERN RAILROAD
EXISTING GRAVEL DRIVE
6th Street (ASPHALT)
Tonnawatt Street (ASPHALT)
FISHER ST.
SEDIMENT DISPOSAL SITE ART SEGAL'S
HANNAWALT ST.
City of Monticello
MARION ST.
WASHINGTON ST.
BROADWAY ST.
TO REYNOLDS
TWIN LAKES HIGH SCHOOL
SCHOOL ST.
MAIN STREET
ILLINOIS ST.
8th STREET
COMMONWEALTH ENGINEERS INC
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY LAKE SEDIMENT BASINS
DISPOSAL SITE
SEDIMENT DISPOSAL SITE PROJ
DRAWING NO. 7



SEDIMENT DISPOSAL LOCATION MAP
N.T.S.







GENERAL NOTES

1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS ARE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCES.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY.

4.) CONTRACTOR WILL BE RESPOSIBLE FOR FINAL GRADING OF DISPOSAL SITE.

5.) CONTRACTOR TO CLEAR AND GRUB ALL TREES WITHIN THE LIMITS OF CONSTRUCTION.

6.) WITHIN LIMITS OF CONSTRUCTION CONTRACTOR TO STRIP AND STOCK PILE TOP SOILPRIOR TO PLACEMENT OF DISPOSED MATERIAL. PRIOR TO FINAL GRADING OF SITE, FILLED AREA SHALL BE COVERED WITH 6" OF TOP SOIL.

7.) PRIOR TO CONSTRUCTION CONTRACTOR SHALL REMOVE ALL BRIARS, BUSHES, AND TREES IN PROPOSED FILL AREA.

LEGEND

PROPOSED CONTOUR	EXISTING WATERS' EDGE
EXISTING CONTOUR	RIPRAP
FARM FIELD FENCE	EXISTING TREE
EXISTING TELEPHONE POLE	SILT FENCE

FILL VOLUME = 25,250 CYS

APPROX. RIPRAP BANK STABILIZATION = 2,350 CYS

10/24/03 C.D.E. REV.

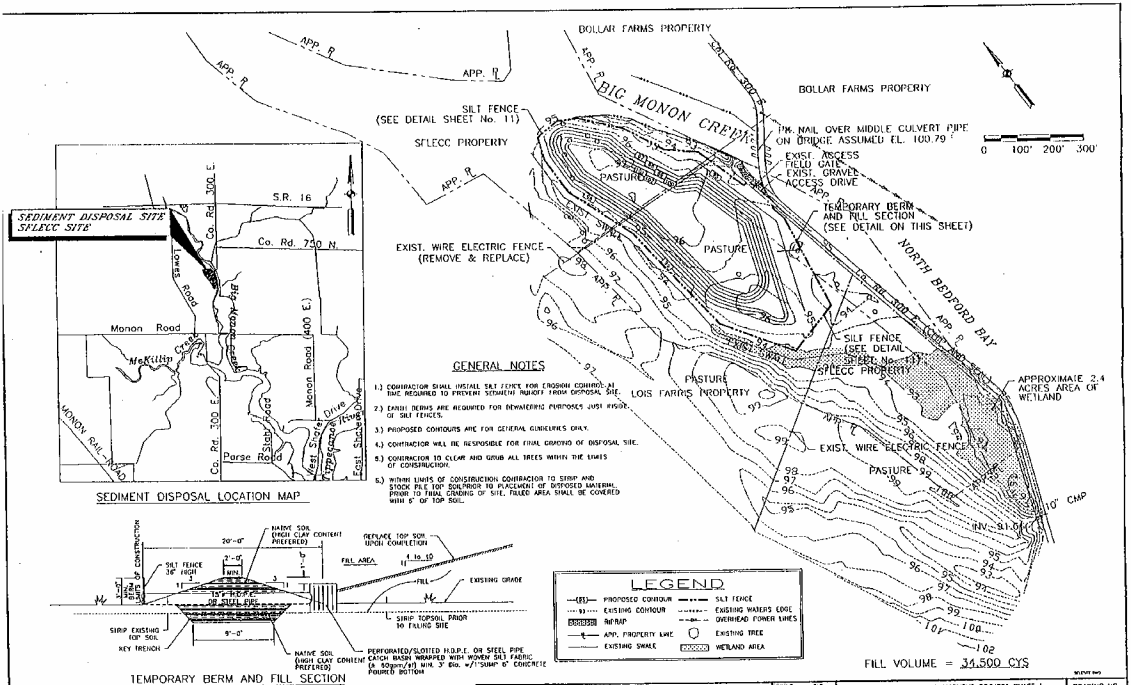
COMMONWEALTH ENGINEERS, INC.

DRAWN BY:	BAS
CHECKED BY:	JWW
SUBMITTED BY:	
DATE:	AUG. 1999
JOB NO.	C993001
SCALE:	1" = 60'

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASWIS
SEDIMENT DISPOSAL SITE
SEDIMENT DISPOSAL SITE
INDIANA BEACH PROPERTY

DRAWING NO. 8

8 OF 11

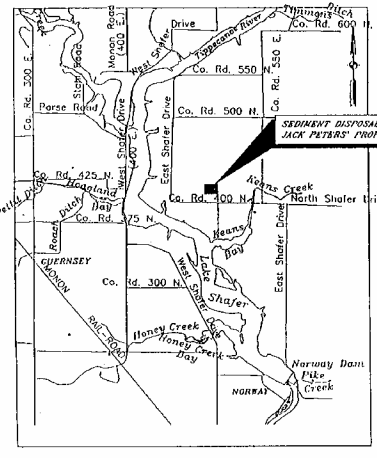


COMMONWEALTH ENGINEERS, INC.

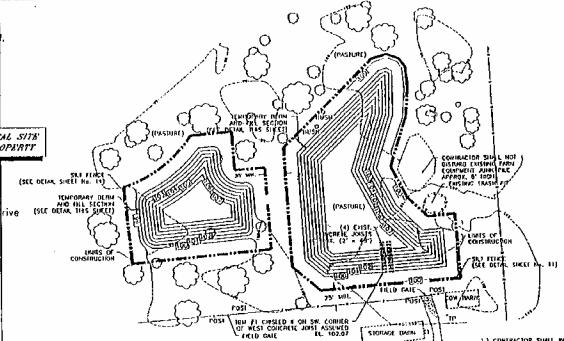
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
SEDIMENT DISPOSAL SITE
SEDIMENT DISPOSAL SITE SFLECC PROPERTY

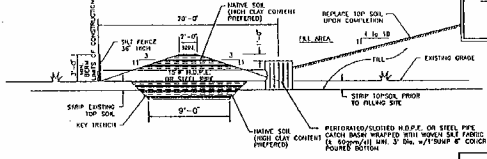
DRAWING NO. 9

9 OF 11



SEDIMENT DISPOSAL LOCATION MAP





TEMPORARY BERM AND FILL SECTION

NO SCALE

COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
INDIANA BAY SEDIMENT BASINS
SEDIMENT DISPOSAL SITE
PETERS PROPERTY

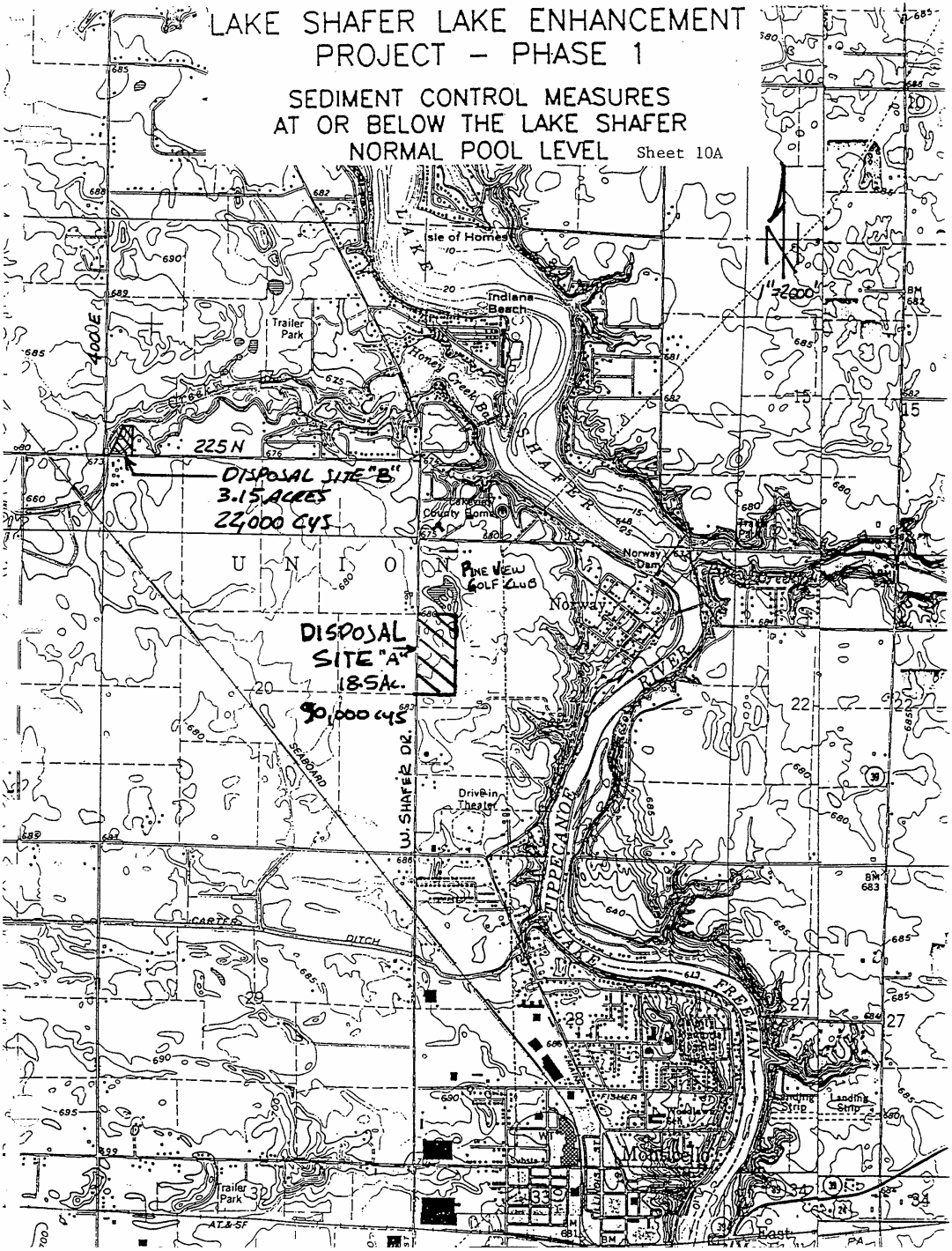
DRAWING NO. 10

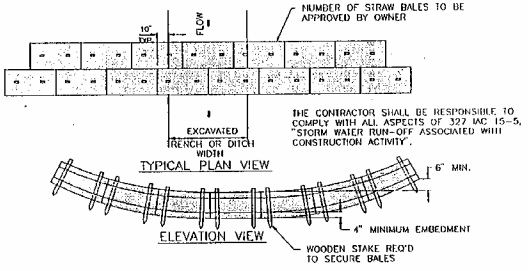
10 OF 11

LAKE SHAFER LAKE ENHANCEMENT PROJECT – PHASE 1

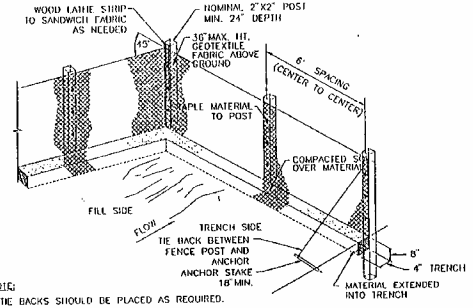
SEDIMENT CONTROL MEASURES AT OR BELOW THE LAKE SHAFER NORMAL POOL LEVEL

Sheet 10A



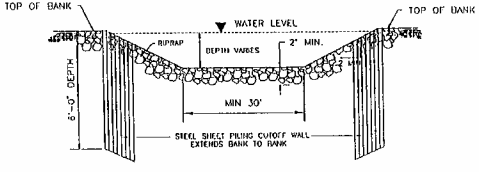


STRAW BALE DAM
N.T.S.



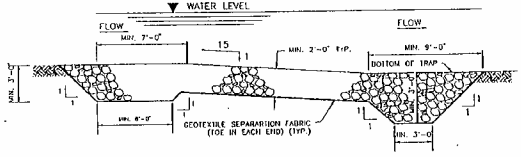
NOTE:
TIE BACKS SHOULD BE PLACED AS REQUIRED.

SILT FENCE DETAIL
N.T.S.

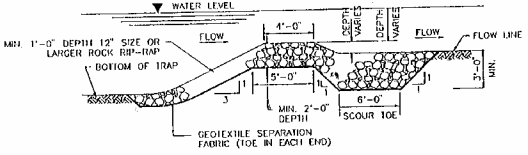


EXCAVATED CHANNEL SEDIMENT BASIN WITH SHEETING
N.T.S

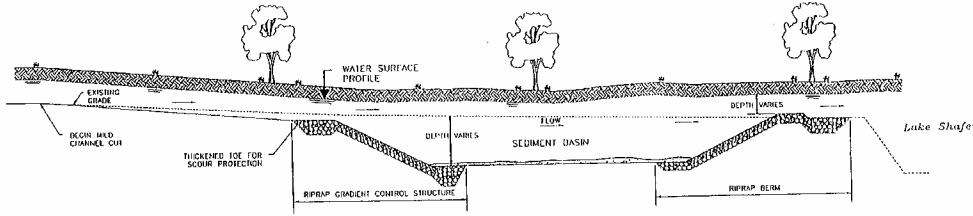
COMMONWEALTH ENGINEERS, INC.	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS		DRAWING NO.
	SEDIMENT TRAP DETAILS		11
	STANDARD DETAILS		11 OF 11



SECTION A-A
ROCK RIPRAP TYPE
GRADE CONTROL STRUCTURE
N.T.S.



SECTION B-B
ROCK BERM DETAIL
N.T.S.



CHANNEL AND BAY PROFILE
N.T.S.

COMMONWEALTH ENGINEERS, INC.

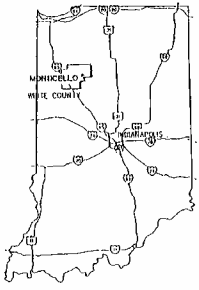
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
SEDIMENT TRAP DETAILS
STANDARD DETAILS

DRAWING NO. 11A
11A OF 11

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY

AUGUST, 1995

PLAN SHEET INDEX



PROJECT AREA LOCATION

SHAFER AND FREEMAN LAKES ENVIRONMENTAL CONSERVATION CORPORATION

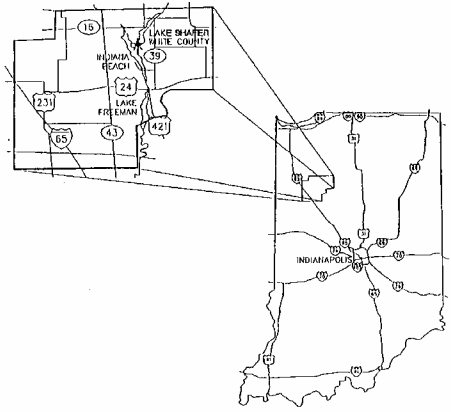
(219) 583-9784

COMMONWEALTH ENGINEERS, INC.

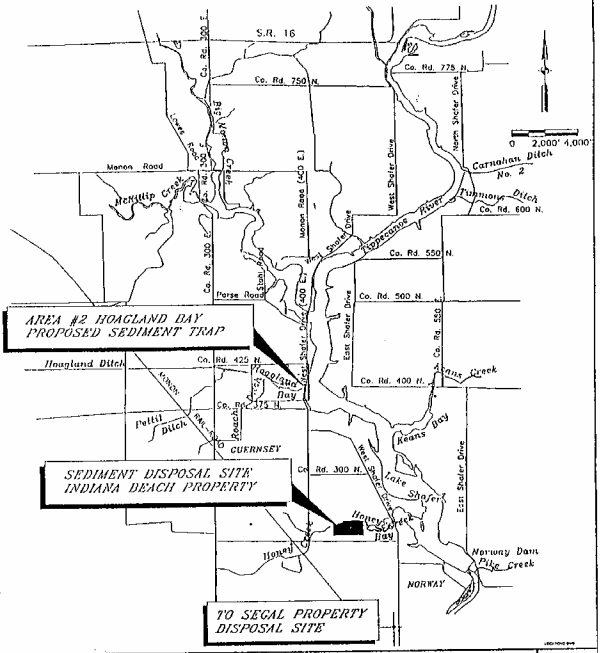
CERTIFIED BY: _____ DATE

G. EDWIN TINKLE II
INDIANA P.E. NO. 15129

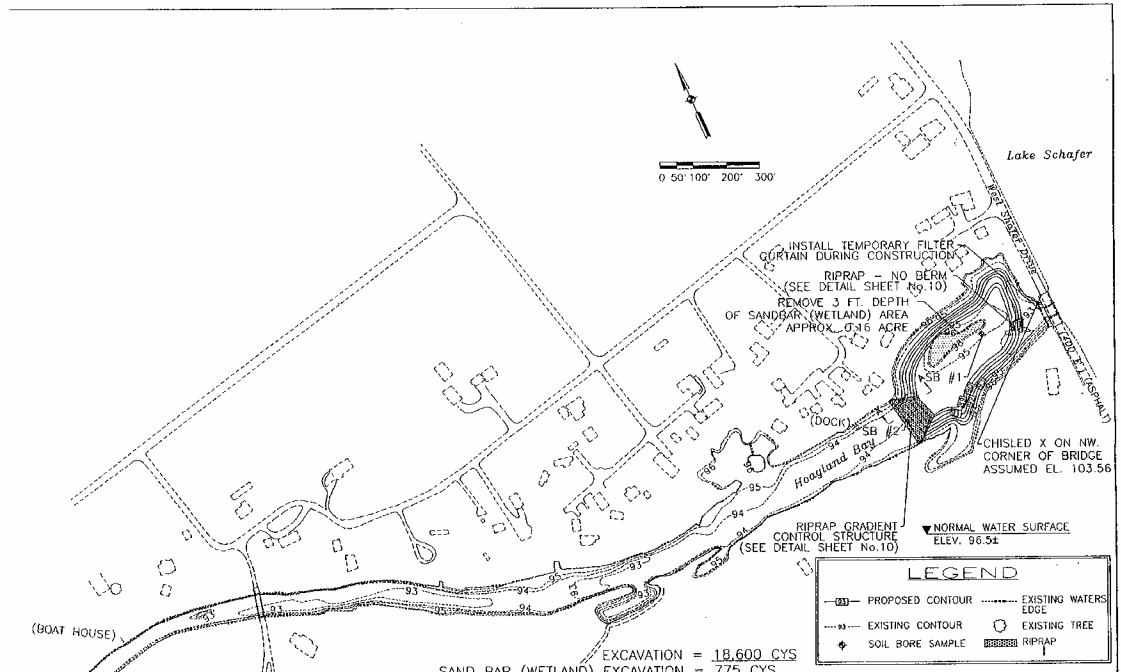
PROJECT NO.: C95B50



PROJECT LOCATION MAP
NO SCALE



COMMONWEALTH ENGINEERS, INC.	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS AREA 2 – HOAGLAND BAY PROJECT LOCATION MAP AND L[illegible]AL SITES	DRAWING NO. 2 5



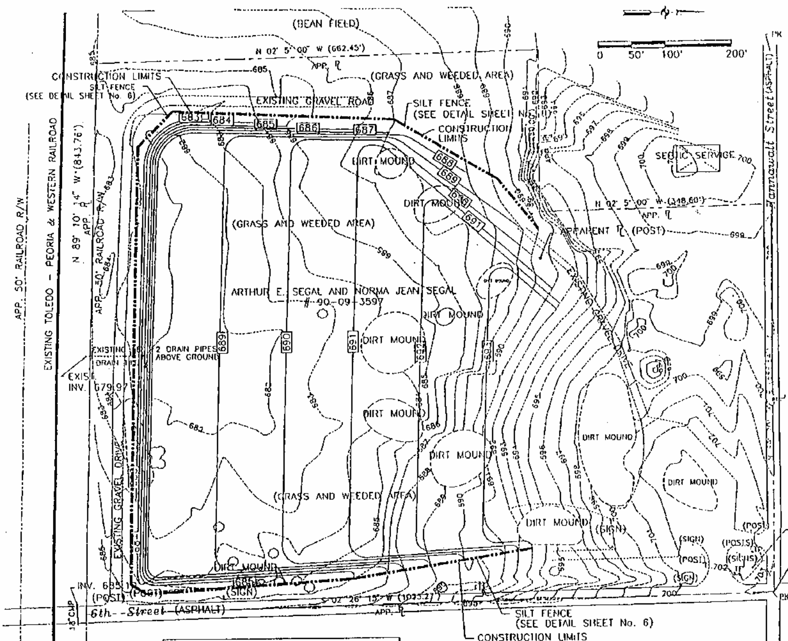
COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS

AREA 2 HOAGLAND BAY

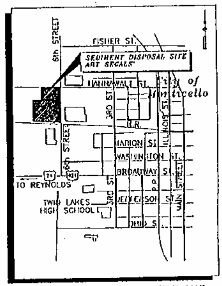
AREA #2 HOAGLAND BAY SITE PLAN

DRAWING NO. 3



LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- SOIL BORE SAMPLE
- RIPRAP
- SILT FENCE LIMITS
- EXISTING WATERS EDGE
- OVERHEAD POWER LINES
- EXISTING TREE
- APP. PROPERTY LINE



SEDIMENT DISPOSAL LOCATION MAP

GENERAL NOTES

1.) CONTRACTOR SHALL IN STALL SILT FENCE FOR EROSION CONTROL AS SHOWN AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS MAY BE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCE IF DISPOSED MATERIAL IS TRANSPORTED HYDRAULICALLY TO THE DISPOSAL SITE.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY !

4.) PROPERTY OWNER WILL BE RESPONSIBLE FOR FINAL GRADING AT DISPOSAL SITES.

FILL VOLUME = 78,200 CYS

NOTE:
EXISTING MOUNDS SHOWN ON THIS SURVEY ARE TEMPORARY AND MAY BE CHANGED ON A DAILY BASIS.

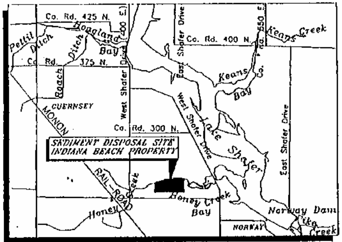
COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY LAKE SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
SEDIMENT DISPOSAL
SEGAL PROPERTY

AUG. 1995

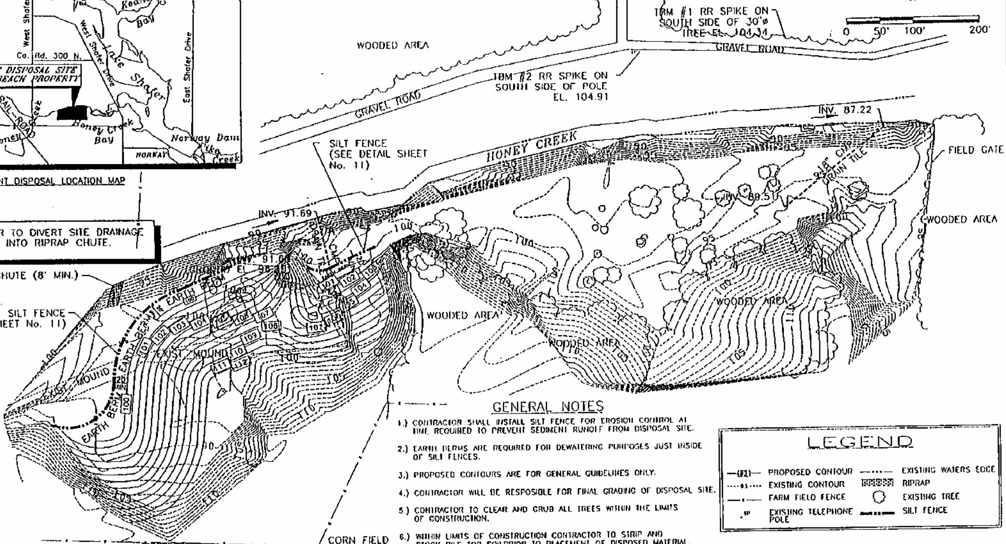
DRAWING NO. 4

4 OF 6



SEDIMENT DISPOSAL LOCATION MAP
N.T.S.

NOTE: CONTRACTOR TO DIVERT SITE DRAINAGE FROM WEST INTO RIPRAP CHUTE.



GENERAL NOTES

1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS ARE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCES.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY.

4.) CONTRACTOR WILL BE RESPOSIBLE FOR FINAL GRADING OF DISPOSAL SITE.

5.) CONTRACTOR TO CLEAR AND GRUB ALL TREES WITHIN THE LIMITS OF CONSTRUCTION.

6.) WITHIN LIMITS OF CONSTRUCTION CONTRACTOR TO STRIP AND STOCK PILE TOP SOILPRIOR TO PLACEMENT OF DISPOSED MATERIAL. PRIOR TO FINAL GRADING OF SITE, FILLED AREA SHALL BE COVERED WITH 6" OF TOP SOIL.

7.) PRIOR TO CONSTRUCTION CONTRACTOR SHALL REMOVE ALL BRIARS, BUSHES, AND TREES IN PROPOSED FILL AREA.

LEGEND

PROPOSED CONTOUR		EXISTING WATERS EDGE	
EXISTING CONTOUR		RIPRAP	
FARM FIELD FENCE		EXISTING TREE	
EXISTING TELEPHONE POLE		SILT FENCE	

FILL VOLUME = 25,250 CYS

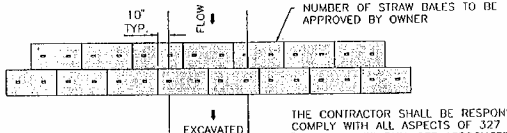
COMMONWEALTH ENGINEERS, INC.

AUG. 1995

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
SEDIMENT DISPOSAL SITE
INDIANA BEACH PROPERTY

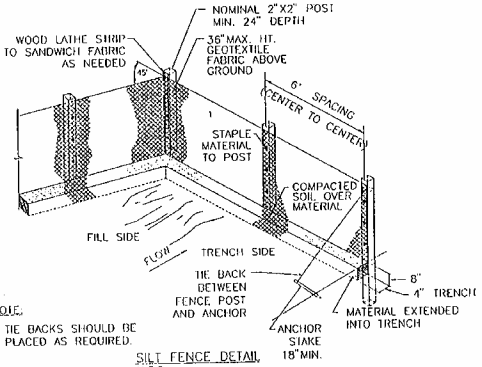
DRAWING NO. 5

5 OF 6



THE CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH ALL ASPECTS OF 327 IAC 15-5, "STORM WATER RUN-OFF ASSOCIATED WITH CONSTRUCTION ACTIVITY".

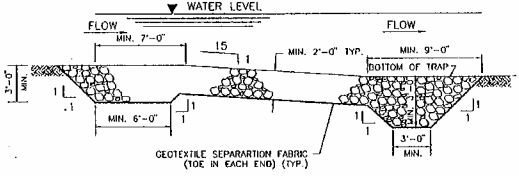
STRAW BALE DAM
N.T.S.



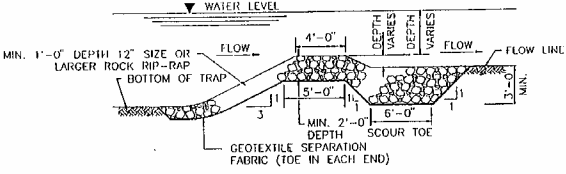
NOTE:
TIE BACKS SHOULD BE PLACED AS REQUIRED.

SILT FENCE DETAIL
N.T.S.

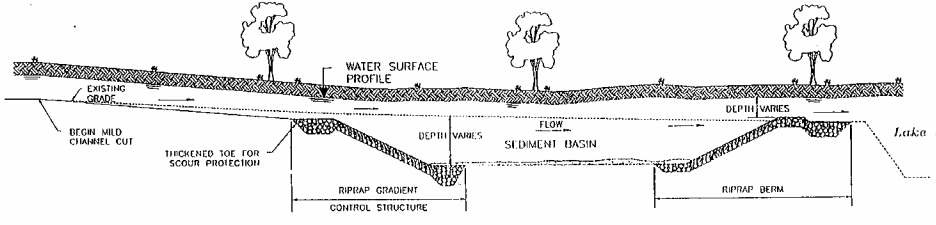
COMMONWEALTH ENGINEERS, INC.	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS		DRAWING NO.
	AREA 2 – HOAGLAND BAY		6A
	STANDARD DETAILS		6 OF 6



ROCK RIPRAP TYPE
GRADE CONTROL STRUCTURE
N.T.S.



SECTION B-B
ROCK BERM DETAIL
N.T.S.



CHANNEL AND BAY PROFILE
N.T.S.

COMMONWEALTH ENGINEERS, INC.	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE 1 TRIBUTARY BAY SEDIMENT BASINS	DRAWING NO.	
	AREA 2 – HOAGLAND BAY	6	
	STANDARD DETAILS	6 OF 6	

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

October 30, 1995

Operations Division
Regulatory Branch (North)
ID No. 199501210-pmr

Mr. Roger Kottlowski
Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, Indiana 46237

Dear Mr. Kottlowski:

This is in regard to your meeting of October 24, 1995, in this office, concerning a proposal to dredge tributaries to create sediment basins and place riprap material to create rock chutes, in Lake Shafer, near Monticello, in White County, Indiana.

We have reviewed the additional data and drawings you submitted and it appears that we have sufficient information to issue a Public Notice. The notice will be issued within the next 2 weeks. Your company will receive a copy of the published notice which will have the opening and closing dates listed.

I would like to thank you for your cooperation in providing the information in a timely manner.

If you have any questions concerning this matter, please contact this office at the above address, ATTN: CEORL-OP-FN or call Mrs. Rucker at (502) 582-5607.

Sincerely,

for Doug Shelton
Chief, North Section
Regulatory Branch

COMMONWEALTH ENGINEERS, INC.
Environmental Engineers & Consultants
7256 Company Drive
Indianapolis, Indiana 46237
Phone: (317) 888-1177
FAX #: (317) 887-8641

LETTER OF TRANSMITTAL

DATE	JOB NO.
October 27,1995	C958801
ATTN Ms. Pat Rucker	
RE Lake Shafer Lake Enhancement	
Project ID No. 199501210-pmr	

TO:
Ms. Pat Rucker
U.S. Army Corps of Engineers
Louisville District
P.O. Box 59
Louisville, KY 40201-0059

GENTLEMEN:

WE ARE SENDING YOU ☐ ATTACHED ☐ UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS:

☐ SHOP DRAWINGS PRINTS ☐ PLANS ☐ SAMPLES ☐ SPECIFICATIONS

☐ COPY OF LETTER ☐ CHANGE ORDER ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	10-27-95		Revised Pine View Golf Club Disposal Site (Now Placed along County Road)
			This revised plan also includes an additional disposal site at CR 225 N near Honey Creek you and the SFLECC apparently visited. It has a small grass area in the middle of it that you or Jerry Newel thought was a possible wetland.

THESE ARE TRANSMITTED AS CHECKED BELOW:

XX FOR APPROVAL ☐ REVIEWED ☐ RESUBMIT _____ COPIES FOR APPROVAL

XX FOR YOUR USE ☐ FURNISH AS CORRECTED ☐ SUBMIT _____ COPIES FOR DISTRIBUTION

XX AS REQUESTED ☐ REVISE AND RESUBMIT ☐ RETURN _____ CORRECTED PRINTS

XX FOR REVIEW AND COMMENT ☐ REJECTED ☐ PRINTS RETURNED AFTER LOAN TO US

☐ FOR BIDS DUE _____ 19__ ☐ _____

REMARKS In the above plan for disposal sites, the site along County Road 225 North at Honey Creek may contain a 0.05 acre wetland. It is proposed that this area be filled since it is in the middle of a bean field. Should you have any questions, please do not hesitate to contact us.

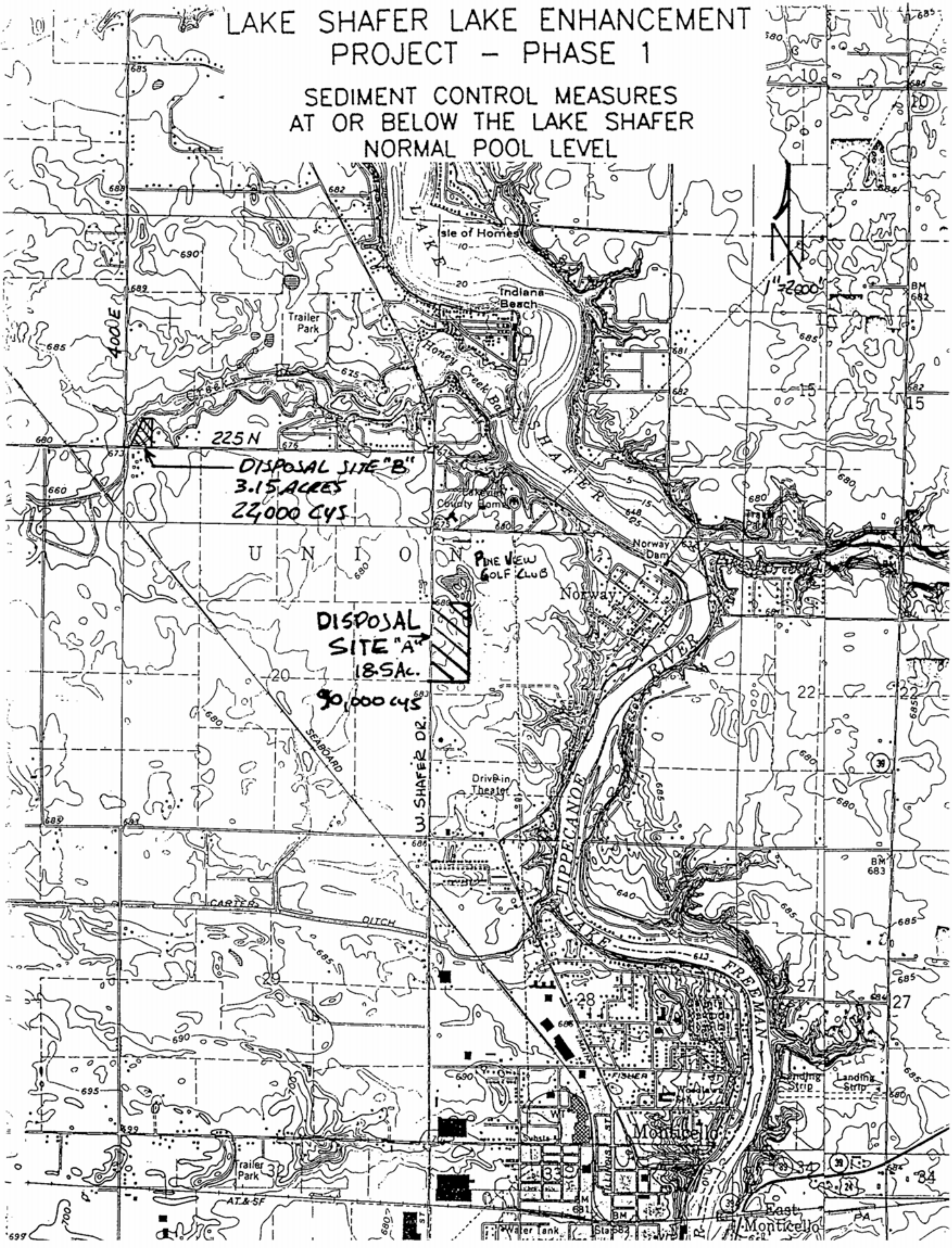
COPY TO C958801/ File
Mr. Armand Coppe

Roger M. Kottlowski, P.E.

(If enclosures are not as noted, kindly notify us at once.)

LAKE SHAFER LAKE ENHANCEMENT PROJECT - PHASE 1

SEDIMENT CONTROL MEASURES AT OR BELOW THE LAKE SHAFER NORMAL POOL LEVEL



COMMONWEALTH ENGINEERS, INC.
Environmental Engineers & Consultants
7256 Company Drive
Indianapolis, Indiana 46237
Phone: (317) 888-1177
FAX #: (317) 887-8641

LETTER OF TRANSMITTAL

DATE	August 29, 1995	JOB NO.
ATTN	Marty Maupin	
RE	Lake Shafer Sediment Control Project	

Office of Water Management
Indiana Department of Environmental Management
100 North Senate Avenue, P.O. Box 6015
Indianapolis, IN 46206-6015

Gentlemen :

WE ARE SENDING YOU ☒ ATTACHED ☐ UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS:

☐ SHOP DRAWINGS ☐ PRINTS ☐ PLANS ☐ SAMPLES ☐ SPECIFICATIONS

☐ COPY OF LETTER ☐ CHANGE ORDER ☐ _____

COPIES	DATE NO.	DESCRIPTION
1		information Supplied to Corps of Engineers For 404 permit
1		Narrative description of Project

THESE ARE TRANSMITTED AS CHECKED BELOW:

☒ FOR APPROVAL ☐ REVIEWED ☐ RESUBMIT _____ COPIES FOR APPROVAL

☐ FOR YOUR USE ☐ FURNISH AS CORRECTED ☐ SUBMIT _____ COPIES FOR DISTRIBUTION

☒ AS REQUESTED ☐ REVISE AND RESUBMIT ☐ RETURN _____ CORRECTED PRINTS

☐ FOR REVIEW AND COMMENT ☐ REJECTED ☐ PRINTS RETURNED AFTER LOAN TO US

☐ FOR BIDS DUE _____ 19___ ☐ _____

REMARKS Dear Marty: If you should have any further questions or comments on our plans feel free to contact me at the number listed above.

COPY TO File/Chron

Sincerely

Steve W. Chafin

(If enclosures are not as noted, kindly notify us at once.)

Narrative Description of Phase 1 Sediment Control Project

History of the Sedimentation Problem at Lake Shafer

In past studies of Lake Shafer it has been documented that sediment bed load accumulation and nutrient loading from the watershed are the primary contributors to the degradation of lake water quality. The original Lake Shafer capacity was reported to be 14,722 acre feet in 1924. A 1954 study (Uhl 1954) measured the sedimentation rate to be 20 acre ft. per year. However, a 1986 (Strange, 1986) study showed the capacity of Shafer to have been reduced to 10,966 acre feet. This is a 25% loss of volume and a sedimentation rate of 60 ace ft. per year from the original capacity. A 1993 study (K&S, 1993) measured the capacity at 9,445 acre ft. This is a loss of 35% of the original volume and a sedimentation rate of 75.4 acre ft. per year since original, and 217 acre ft. per year just since 1986.

Proposed Sediment Traps in the Tributary Embayments

Since sedimentation rates have accelerated at such an alarming rate, the SFLECC is moving to develop sediment trapping basins in the tributaries contributing the largest volumes of sediment to Shafer (exclusive of the Tippecanoe River) in this phase of the restoration project.

They will be excavated with hydraulic dredging equipment and have rip-rap erosion control measures placed in the upstream and downstream ends of the basins. The upstream end of the basins will also have heavy rip-rap lined chutes to prevent head cutting of the basins. The basins are expected to need periodic maintenance dredging until comprehensive watershed treatments can be installed to stabilize the watershed.

Future phases will focus on reduction of water runoff rates and restoration of wetlands and natural stream reaches in the watershed as well as bank stabilization of ditches in the watershed.

The objective of the sedimentation basins is to slow the rate of lake volume loss until comprehensive watershed land treatment (the next phase), can reduce the rates of runoff and peak discharge. Another objective of the basins is to trap the sediment associated nutrients to reduce nutrient loading to the lakes. This particular project is just one phase of the Shafer-Freeman Lakes Environmental Conservation Corporation's (SFLECC) ongoing efforts to restore Lake Shafer.

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires October 1988

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
19950 1210		07 Aug 95	

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	6. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
Shafer-Freeman Lakes Environ. Conservation Comm. Robert E. Coates, Chairperson of Sediment Committee	Commonwealth Engineers, Inc. Steve W. Chafin, Environmental Scientist
8. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
P.O. Box 372 Monticello, Indiana 47960	7256 Company Drive Indianapolis, Indiana 46237
7. APPLICANT'S PHONE NOS. W/AREA CODE	**10. AGENT'S PHONE NOS. W/AREA CODE**
a. Residence b. Business (219) 583-9784	a. Residence b. Business (317) 888-1177

STATEMENT OF AUTHORIZATION

11. I hereby authorize, STEVE W. CHAFIN to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

R E Coates 8/4/95
APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*
Lake Shafer Lake Enhancement Project - Tributary Bay Sedimentation Basins

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*
Lake Shafer	NOT APPLICABLE
15. LOCATION OF PROJECT	
White (COUNTY) Indiana (STATE)	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, *(see instructions)*
Union, Monon and Liberty Townships within Range 3 West and 4 West

17. DIRECTIONS TO THE SITE
Lake Shafer north of the City of Monticello from the Norway Dam north to the unincorporated Town of Buffalo. (See attached location map)

18. Nature of Activity (*Description of project, include all features*)

SEE ATTACHED PLANS

19. Project Purpose (*Describe the reason or purpose of the project, see instructions*)

To create a sediment basin which will prevent silt and sediment being carried down the Lake Shafer tributaries from entering Lake Shafer itself, thus lessening the amount of sedimentation which occurs in the Lake.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Geotextile filter fabric and hand laid rip-rap will be installed at the upstream end of each sediment basin as a rock chute and at the downstream end of each basin to protect a berm of native earth to function as a submerged weir. Rip-rap is for erosion control only.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

Material placed beneath water is limestone rip-rap and geotextile filter fabric. Approximately 3,430 cubic yards of rip-rap will be placed in all basins combined.

22. Surface Area in Acres of Wetlands or Other Waters Filled (*see instructions*)

Attached plans show the locations of rip-rap to be placed in wetlands. Rip-rap will be hand laid or placed with a front-end loader.

23. Is Any Portion of the Work Already Complete? Yes ____ No XX IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
IDNR			8-03-95		

*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT — DATE 8/4/95 — SIGNATURE OF AGENT — DATE 8/4/95

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

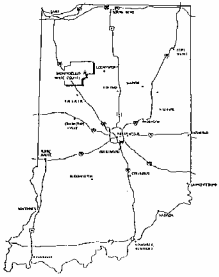
18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

*U.S.GPO:1994-520-478/82015

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREAS 1 THROUGH 5

AUGUST, 1995

PLAN SHEET INDEX



PROJECT AREA LOCATION

BOARD OF DIRECTORS

ARMAND COPPE	PRESIDENT	PAUL CRIPE	VICE-PRESIDENT
BARBARA KAWECKI	SECRETARY	JACK McNALLY	TREASURER
CHUCK BURKE	MEMBER	RICHARD LORAAS	MEMBER
JIM BROWN	MEMBER	BILL LUSE, SR.	MEMBER
BRUCE CLEAR	MEMBER	ED SVOBODA	MEMBER
ROBERT COATES	MEMBER	WILLIAM SYPHERS	MEMBER
ED GRIST	MEMBER	DON TRIBBETT	MEMBER
JOHN KOPPELMANN	MEMBER		

BOARD OF ADVISORS

TOM WAGNER	ADVISOR	MARY WALTERS	ADVISOR
JOHN T. MILLION	ADVISOR	JIM MILLIGAN	ADVISOR
LORETTA LOY	ADVISOR	JIM SHARP	ADVISOR

SFLECC
ENVIRONMENTAL CONSERVATION CORPORATION

(219) 583-9784

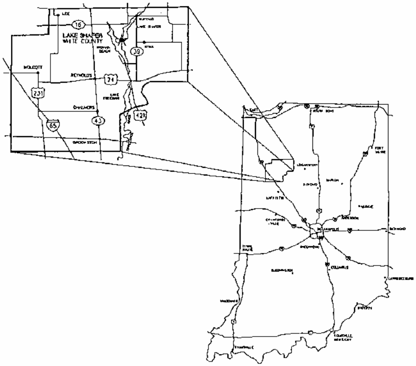
SHAFER AND FREEMAN LAKES ENVIRONMENTAL CONSERVATION CORPORATION

COMMONWEALTH ENGINEERS, INC.

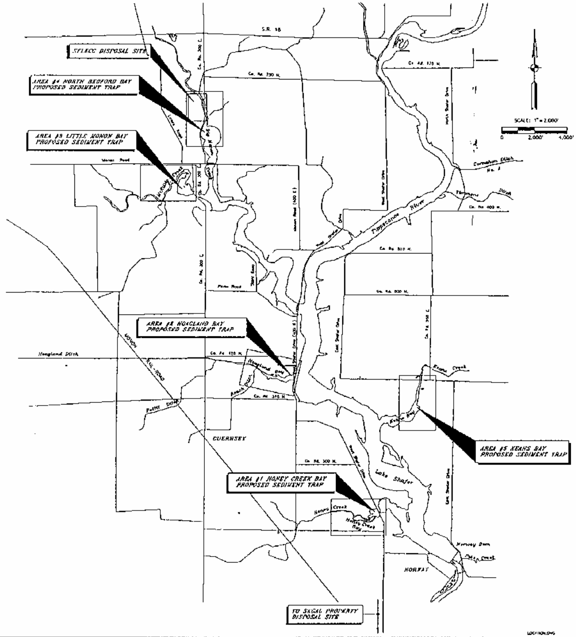
CERTIFIED BY: _____ DATE

RICHARD A. LAUTZ
INDIANA P.E. NO. 9992

PROJECT NO. : C93007

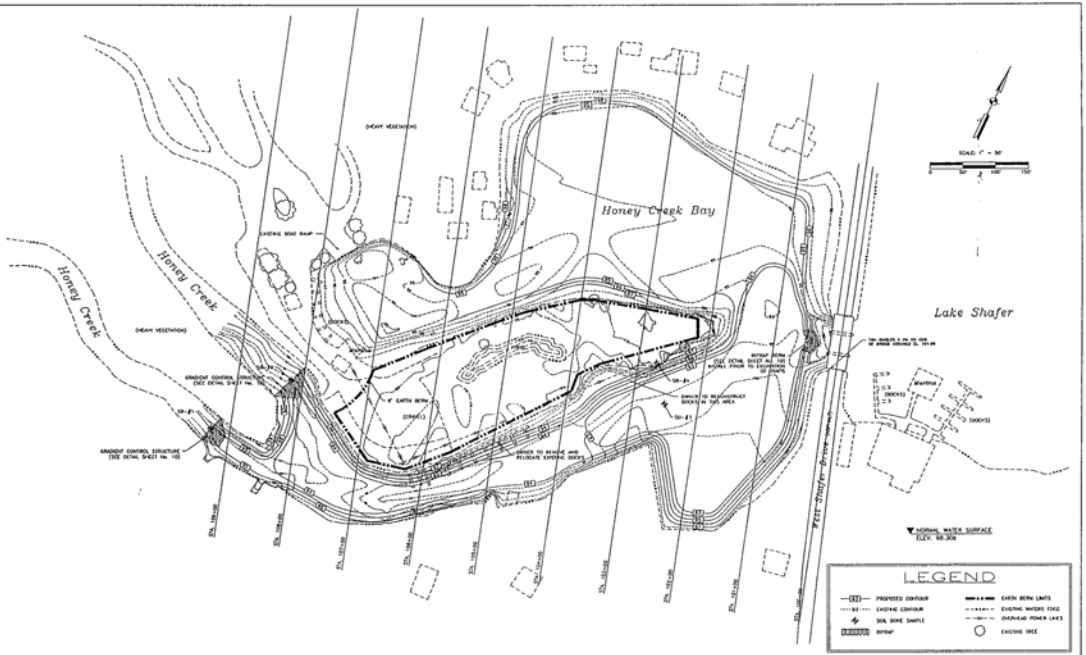


PROJECT LOCATION MAP
NO SCALE



LOCATION.DWG

COMMONWEALTH ENGINEERS, INC.	DRAWN BY: BAR DESIGNED BY: RMK CHECKED BY: DATE: AUG. 1995 JOB NO. C950001 SCALE: 1" = 2,000'	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS PROJECT LOCATION PROJECT LOCATION MAP AND PROJECT SITES	DRAWING NO. 2 2 OF 10



COMMONWEALTH ENGINEERS, INC.

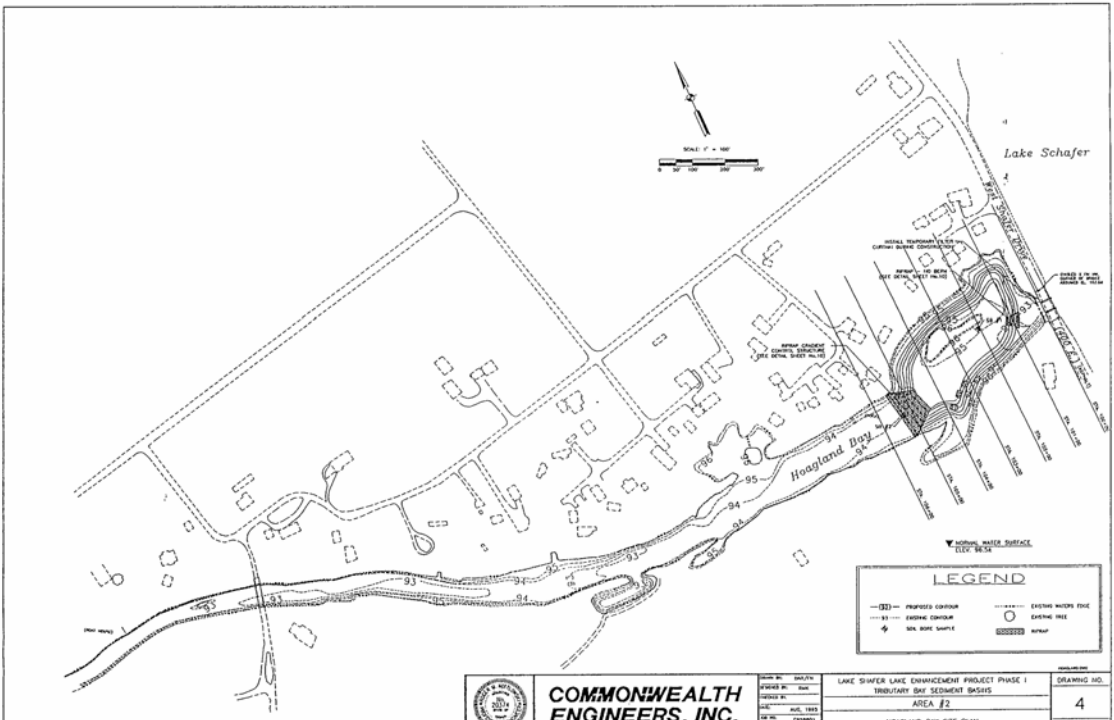
DRAWN BY:	SMH/JTG
SCHEMED BY:	Rank
CHECKED BY:	
DATE:	AUG. 1995
JOB NO:	C935001
SCALE:	1"=50'

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA #1
HONEY CREEK BAY SITE PLAN

REVISIONS:

DRAWING NO. 3

3 OF 10

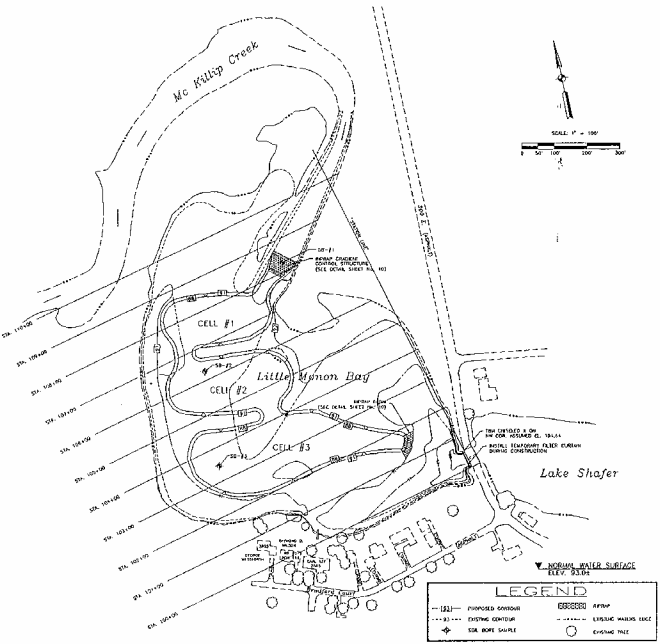


COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASIN
AREA #2
HOAGLAND BAY SITE PLAN

DRAWING NO. 4

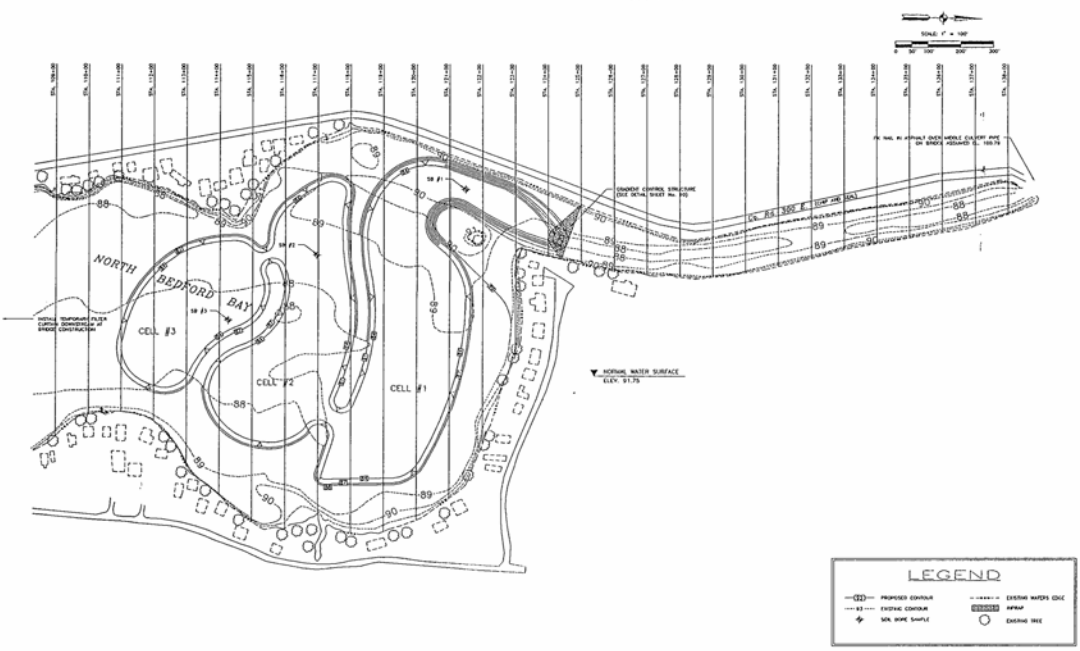
4 of 10



COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA #3
LITTLE MANON BAY SITE PLAN

DRAWING NO.
5
5 OF 10

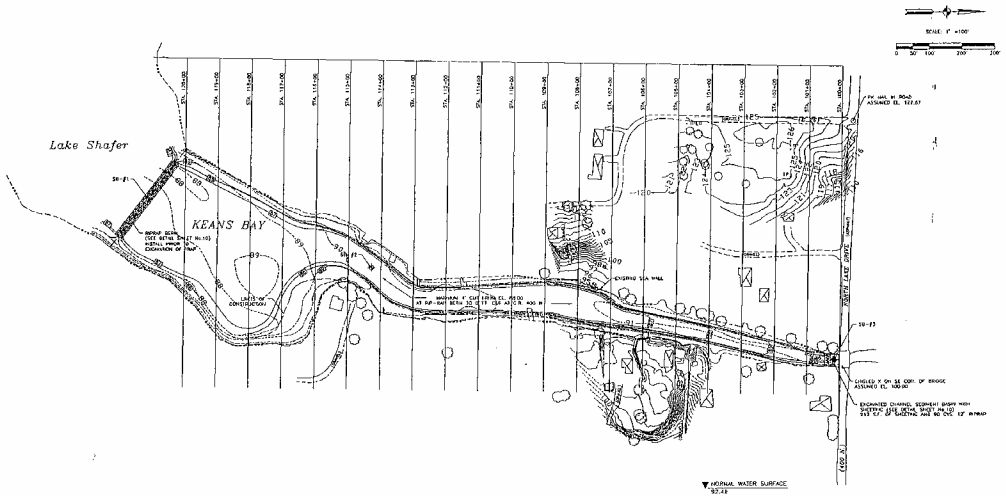


COMMONWEALTH ENGINEERS, INC.

DRAWN BY:	SHUTH
ECHED BY:	RMR
ISSUED BY:	
DATE:	AUG. 1995
JOB NO.	CW5801
SCALE:	1" = 100'

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA #4
NORTH BEDFORD BAY SITE PLAN

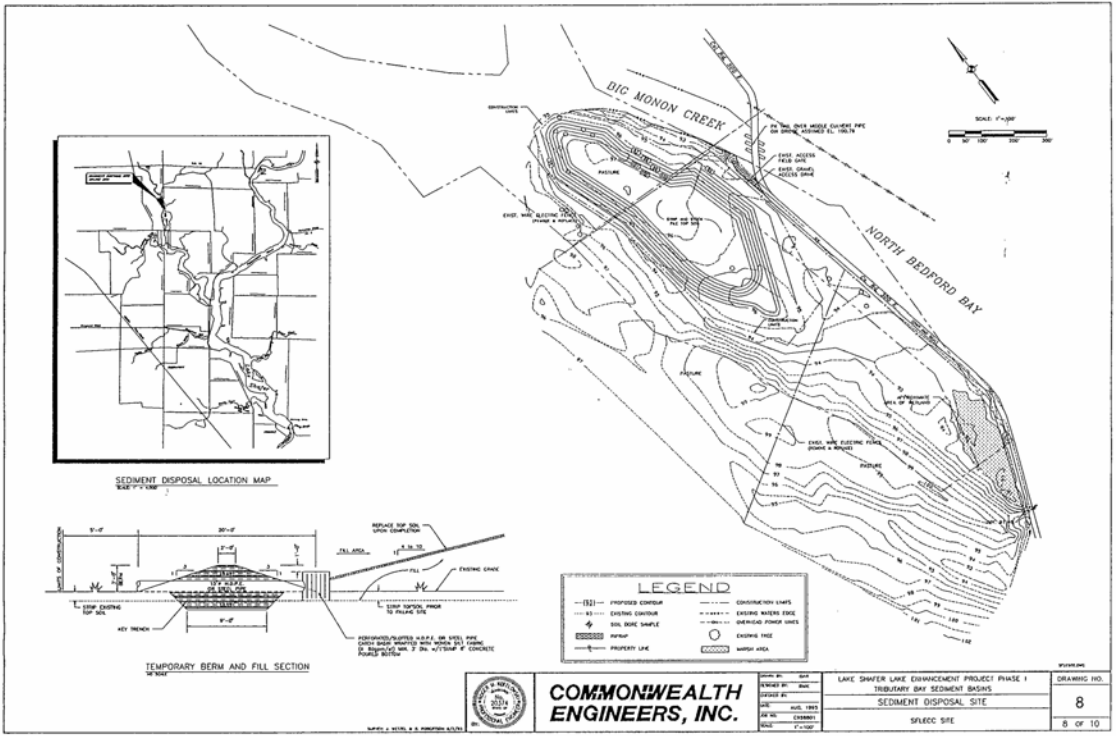
BUILDING
DRAWING NO.
6
6 OF 10

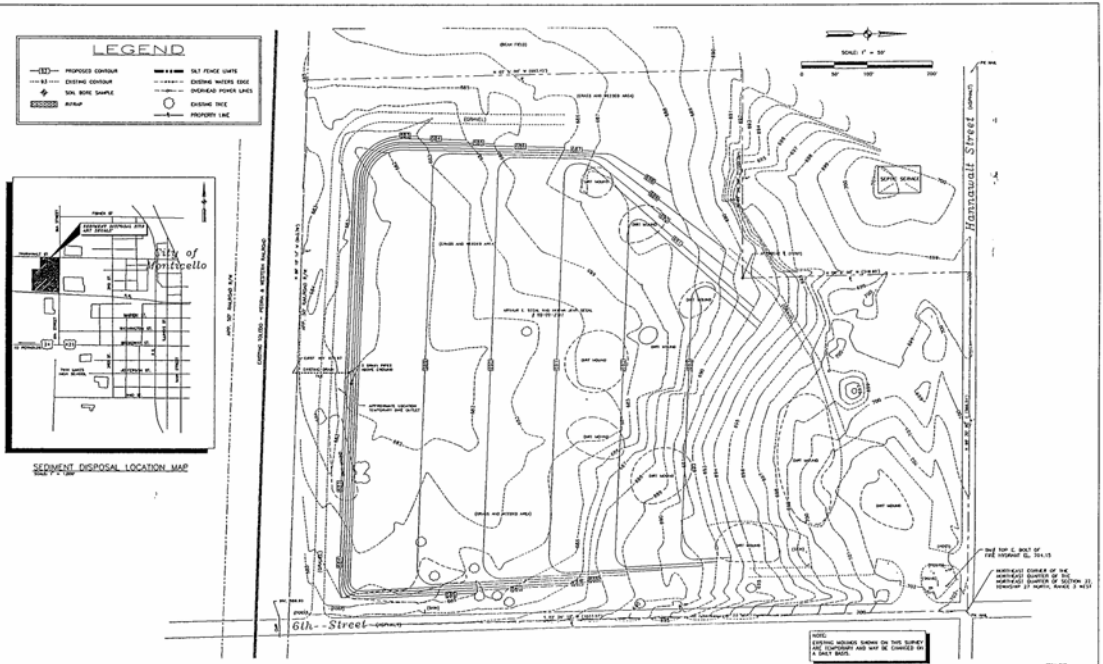


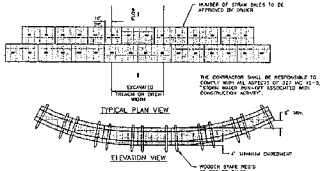
LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- EXISTING WATERS EDGE
- RIPRAP
- SEA WALL SAMPLE
- EXISTING SPOT
- EXISTING TELEPHONE POLE
- EXISTING TELEPHONE PEDESTAL

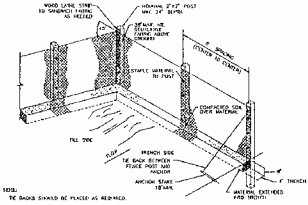
COMMONWEALTH ENGINEERS, INC.	DRAWN BY: BWJ/TH DESIGNED BY: BWK CHECKED BY: DATE: JULY, 1997 JOB NO.: 2930001 SCALE: 1" = 100'	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS AREA #5 KEANS BAY SITE PLAN	DRAWING NO. 7 7 OF 10


BIG MONON CREEK
NORTH BEDFORD BAY
PASTURE
SEDIMENT DISPOSAL LOCATION MAP
TEMPORARY BERM AND FILL SECTION
REPLACE TOP SOIL UPON COMPLETION
FILL AREA
FILL
EXISTING GRADE
STRIP EXISTING TOP SOIL
KEY TRENCH
LEGEND
PROPOSED CONTOUR
EXISTING CONTOUR
SOIL BORE SAMPLE
RIPRAP
PROPERTY LINE
CONSTRUCTION LIMITS
EXISTING WATERS EDGE
OVERHEAD POWER LINES
EXISTING TREE
MARSH AREA
COMMONWEALTH ENGINEERS, INC.
AUG. 1993
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
SEDIMENT DISPOSAL SITE
SFLECC SITE
DRAWING NO.
8
8 OF 10

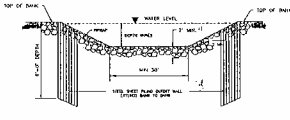

LEGEND
PROPOSED CONTOUR
EXISTING CONTOUR
SOIL BORE SAMPLE
RIPRAP
SILT FENCE LIMITS
EXISTING WATERS EDGE
OVERHEAD POWER LINES
EXISTING TREE
PROPERTY LINE
City of Monticello
SEDIMENT DISPOSAL LOCATION MAP
Hasnawalt Street
6th Street
SEDIMENT DISPOSAL SITE
SEGAL PROPERTY
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY LAKE SEDIMENT BASINS
COMMONWEALTH ENGINEERS, INC.
DRAWING NO.
9
9 OF 10



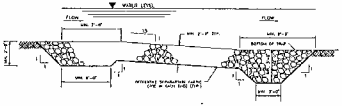
STRAW BALE DAM
N.T.S.



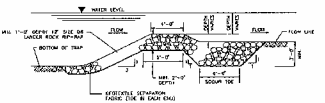
SILT FENCE DETAIL
N.T.S.



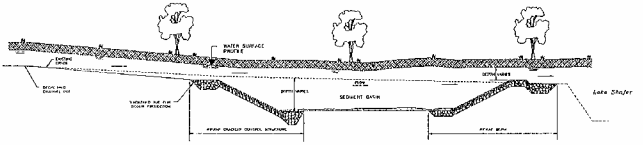
EXCAVATED CHANNEL SEDIMENT BASIN WITH SHEETING
N.T.S.



ROCK RIPRAP TYPE
GRADE CONTROL STRUCTURE
N.T.S.



ROCK BERM DETAIL
N.T.S.



CHANNEL AND BAY PROFILE
N.T.S.

COMMONWEALTH ENGINEERS, INC.	DRWN BY: BAR DESCHKD BY: RHK CHKD BY: DATE: MAY, 1999 JOB NO: 0958501 SCALE: AS NOTED	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS SEDIMENT TRAP DETAILS STANDARD DETAILS	DRAWING NO. 10 10 OF 10

COMMONWEALTH ENGINEERS, INC.
Environmental Engineers & Consultants
7256 Company Drive
Indianapolis, Indiana 46237
Phone: (317) 888-1177
FAX #: (317) 887-8641

LETTER OF TRANSMITTAL

DATE	JOB NO.
September 19, 1995	
ATTN	Pat Rucker
RE	Lake Shafer Sediment Control
	Project I.D. No. 19950131D-pms

U.S. Army Engineer Louisville District
P.O. Box 59
Louisville, KY 40201-0059

Gentlemen :

WE ARE SENDING YOU ☒ ATTACHED ☐ UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS:

☐ SHOP DRAWINGS ☐ PRINTS ☐ PLANS ☐ SAMPLES ☐ SPECIFICATIONS

☐ COPY OF LETTER ☐ CHANGE ORDER ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	Sept. 15		Response letter from CEI
1	Sept. 19		Wetland Delineation Report
1			Construction plans revised as per your 8/31 request

THESE ARE TRANSMITTED AS CHECKED BELOW:

☒ FOR APPROVAL ☐ REVIEWED ☐ RESUBMIT _____ COPIES FOR APPROVAL

☒ FOR YOUR USE ☐ FURNISH AS CORRECTED ☐ SUBMIT _____ COPIES FOR DISTRIBUTION

☒ AS REQUESTED ☐ REVISE AND RESUBMIT ☐ RETURN _____ CORRECTED PRINTS

☐ FOR REVIEW AND COMMENT ☐ REJECTED ☐ PRINTS RETURNED AFTER LOAN TO US

☐ FOR BIDS DUE _____ 19___ ☐ _____

REMARKS Dear Ms. Rucker: If you have any questions or comments on this information please feel free to give us a call.

COPY TO File/Chron

Sincerely

Steve W. Chafin

(If enclosures are not as noted, kindly notify us at once.)

COMMONWEALTH ENGINEERS, INC.

September 15, 1995

Attention: Ms. Pat Rucker
U.S. Army Corps of Engineers, Louisville District
P.O. Box 59
Louisville, Ky 40201-0059

Re: Lake Shafer Lake Enhancement Project

Dear Ms. Rucker:

Although the SFLECC owns the bed of Lake Shafer, since all of the excavation activities to create the actual sediment traps are in the Lake Shafer bed and below the ordinary high water (OHW) line of the lake the Corps of Engineers has jurisdiction over the excavation. .

On July 18th CEI felt we were far enough along on design plans that we could begin to coordinate with the Corps of Engineers on project specifics. We talked to Matt Kuzrinsky of the Fort Harrison office and Bob Kramer of the Louisville District office to determine how we should most effectively proceed with submittal of Section 404 permit application. Since the sediment trap projects are all on the same body of water and were very similar in nature we were told we could submit this project under one permit application.

In your August 31, 1995 letter you stated you needed additional information on eight items. Following is a list of the additional information you requested with an explanation of how we have responded.

a. "Plans resubmitted with larger lettering size"

- The plans have had the lettering expanded and have been reprinted. They are enclosed. Station lines have also been removed.

b. "A delineation of the wetland boundaries around the project site and the boundaries indicated on the plan views, and a wetland delineation report. Also explain any mitigation proposed."

- As per our telephone conversation on September 12, since most of the proposed project is in the lake bed of Lake Shafer a delineation of only two wetlands were required. Since all sediment traps are unquestionably within COE jurisdiction it was deemed unnecessary to delineate all wetland sites within the lake. The two areas where there was some question of jurisdiction were delineated. This was required to determine the locational boundaries of these two wetlands in relation to the planned construction activities.

- These two areas are in the vicinity of the North Bedford Bay sediment disposal site and the Hoagland Bay sediment trap site.

- Presently there is not any proposed mitigation due to the fact that there is no significant loss of wetland area due to this construction activity. In fact the project increases the volume of aquatic habitat. We feel that there is a net improvement in aquatic resources as a result of this project. So does the IDNR and IDEM. That is why they have elected to fund the project.

7256 Company Drive
Indianapolis, Indiana 46237
(317) 888-1177
FAX (317) 887-8641

c. "Locate cross sections on plan view drawings."

- This was done on the submitted plans.

d. "Indicate how dredging is to be performed."

- The dredging operation will most likely be performed utilizing a hydraulic dredge. However, some dredging may be performed with land based reaching buckets such as an extend-a-hoe. The methods will be dependent on the equipment and skilled labor available to the individual contractor(s) that perform the work. The vast majority of the dredging is anticipated to be done hydraulicly. BMPS are to be utilized for all earth moving activities.

e. "Indicate how material will be handled an contained."

- Following is a list of planned sediment disposal strategies:

  Keans Bay - No material will be stockpiled on site. All material shall be promptly removed and placed directly in a disposal site.

  Honey Creek Bay - approximately one third of the material removed will be placed on the existing peninsula/parking lot, for temporary stockpiling and then moved to a disposal site.

  Hoagland Bay - the planned dredge spoil handling would involve transport of sediment directly to disposal sites without any storage on site. There are no suitable sites adjacent to the project area for stockpiling.

  McKillip Ditch Bay - Presently we have no designated disposal site for McKillip Ditch material. However, as one or more sites becomes available, the sediment will be required to be transported directly to the disposal site since there is no good location for sediment stockpiling at the sediment trap construction site.

  North Bedford Bay - Again, more disposal space is needed here. The dredged sediment must be transported directly to the disposal site since there is no good location for sediment stockpiling at the sediment trap construction site.

f. "Indicate if the sediment basins will need to be maintained."

- Yes, the sediment traps will need to be cleaned periodically. A maintenance schedule is being prepared for an operations and maintenance manual.

g. "Dredge areas should be clearly delineated (projection and depth). You should show the existing and proposed contours."

- This is done on the plans.

h. Indicate how many cubic yards of material the disposal areas can hold. Show containment features (berm height, decant water release elevation, final dredged material elevation).

- Added to plans.

As always, if you have any questions or comments feel free to call us at any time.

Sincerely ,

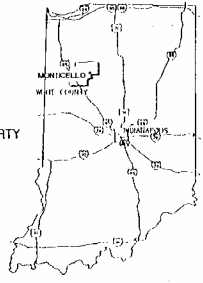
Steve W. Chafin, Environmental Scientist

Enclosure

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREAS 1 AND 3 THROUGH 5

PLAN SHEET INDEX

AUGUST, 1995



PROJECT AREA LOCATION

BOARD OF DIRECTORS

ARMAND COPPE	PRESIDENT	PAUL CRIPE	VICE-PRESIDENT
BARBARA KAWECKI	SECRETARY	JACK McNALLY	TREASURER
CHUCK BURKE	MEMBER	RICHARD LORAAS	MEMBER
JIM BROWN	MEMBER	BILL LUSE, SR.	MEMBER
BRUCE CLEAR	MEMBER	ED SVOBODA	MEMBER
ROBERT COATES	MEMBER	WILLIAM SYPHERS	MEMBER
ED GRIST	MEMBER	DON TRIDDETT	MEMBER
JOHN KOPPELMANN	MEMBER		

BOARD OF ADVISORS

TOM WAGNER	ADVISOR	MARY WALTERS	ADVISOR
JOHN T. MILLION	ADVISOR	JIM MILLIGAN	ADVISOR
LORETTA LOY	ADVISOR	JIM SHARP	ADVISOR

SHAFER AND FREEMAN LAKES ENVIRONMENTAL CONSERVATION CORPORATION

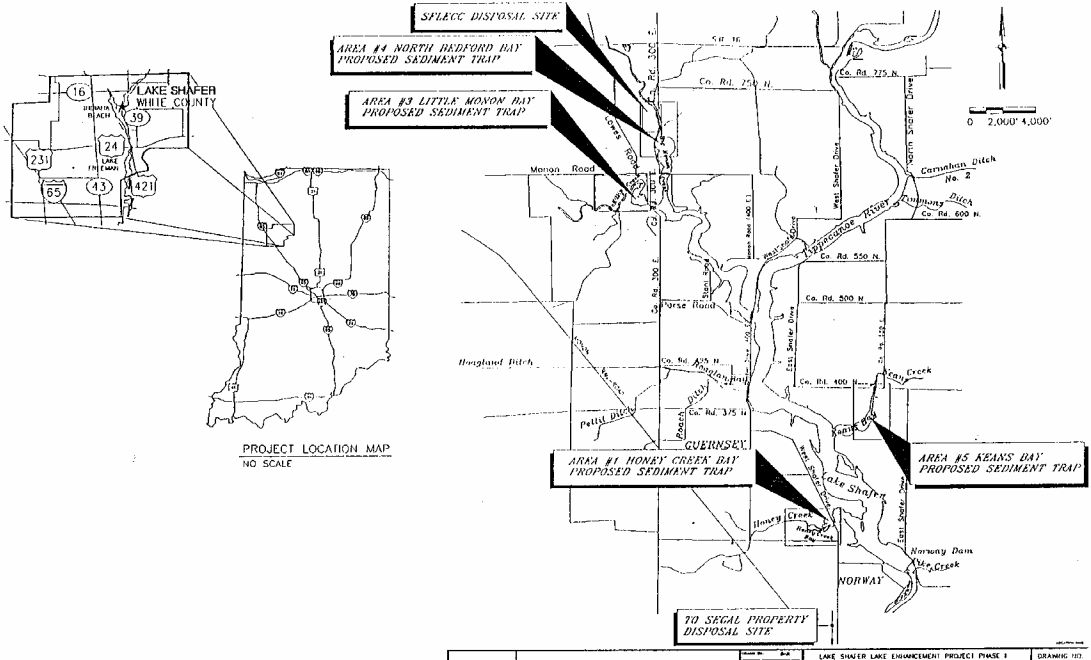
(219) 583-9784

SHAFER AND FREEMAN LAKES ENVIRONMENTAL CONSERVATION CORPORATION

COMMONWEALTH ENGINEERS, INC.

CERTIFIED BY: _____ DATE
G. EDWIN TINKLE I
INDIANA P.E. NO. 10101

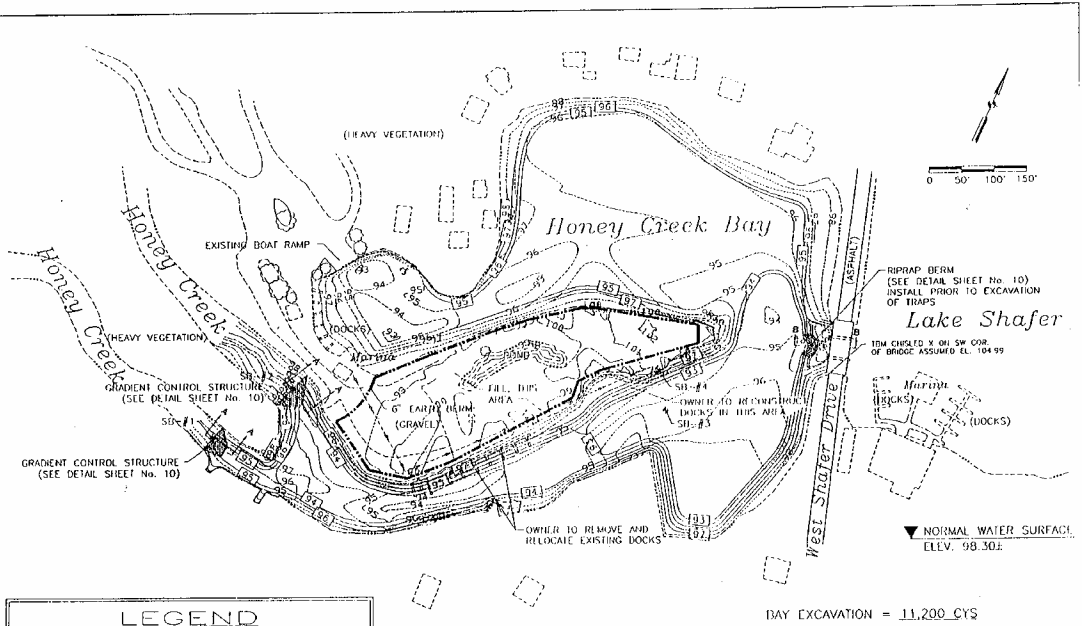
PROJECT NO. : C95801



COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE 1
TRIBUTARY BAY SEDIMENT BASINS
AREAS 1,3,4 AND 5
PROJECT LOCATION MAP AND DISPOSAL SITES

DRAWING NO. 2



LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- SOIL BORE SAMPLE
- RIPRAP
- EARTH BERM LIMITS
- EXISTING WATERS EDGE
- OVERHEAD POWER LINES
- EXISTING TREE

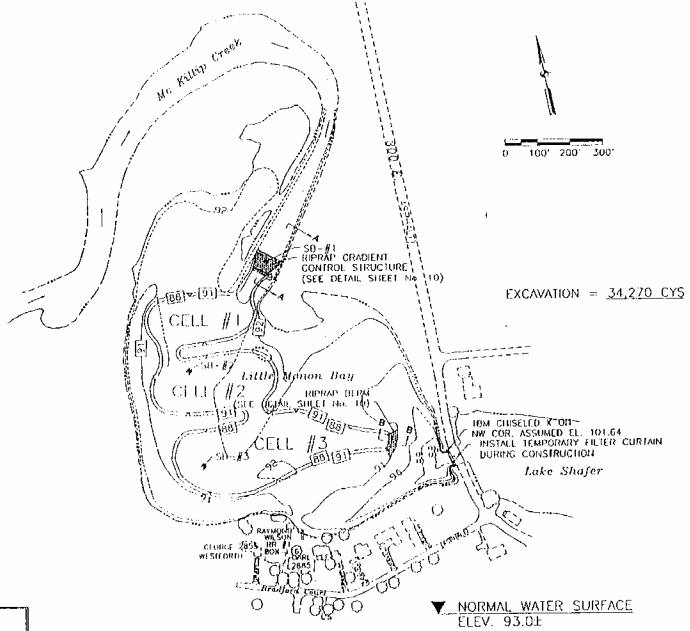
BAY EXCAVATION = 11,200 CYS

PENINSULA FILL VOLUME = 8,000 CYS

COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA #1
HONEY CREEK BAY SITE PLAN

DRAWING NO. 3



LEGEND

—(93)— PROPOSED CONTOUR	RIPRAP
---93--- EXISTING CONTOUR	EXISTING WATERS EDGE
SOIL BORE SAMPLE	EXISTING TREE

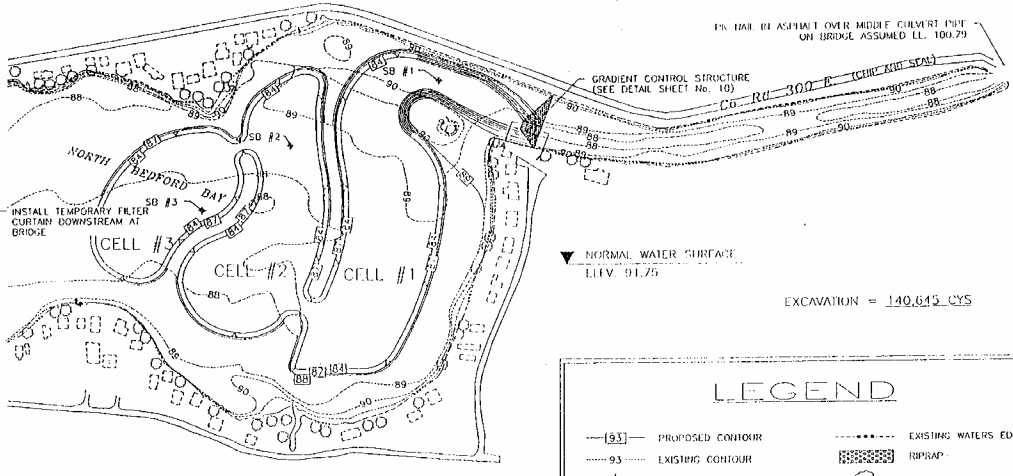
COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS

AREA #3

LITTLE MANON BAY SITE PLAN

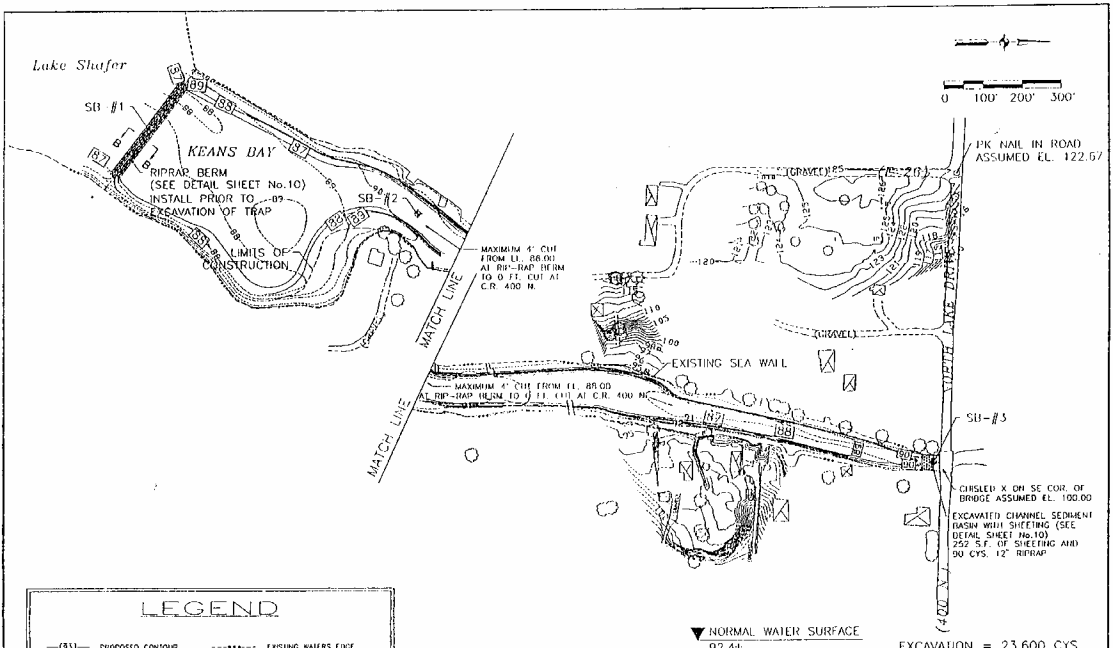
DRAWING NO. 4



COMMONWEALTH ENGINEERS, INC.

LAKE SHAWER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA #1
NORTH BEDFORD BAY SITE PLAN

DRAWING NO. 5



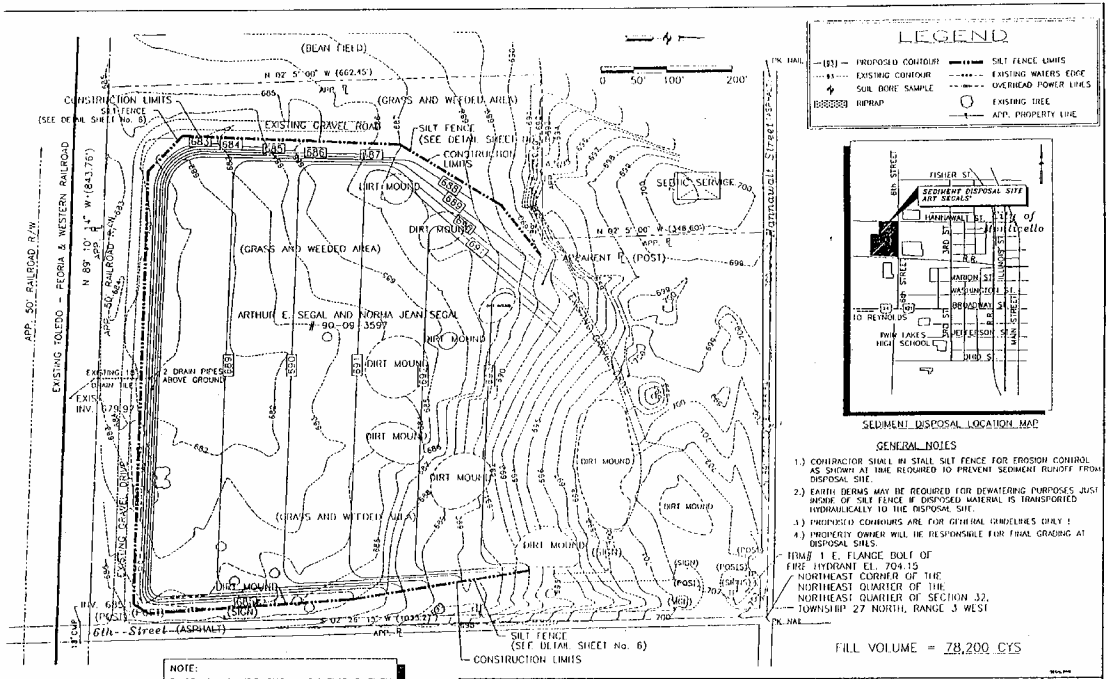
COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS

AREA #5

KEANS BAY SITE PLAN

DRAWING NO. 6



SEDIMENT DISPOSAL LOCATION MAP

GENERAL NOTES

1.) CONTRACTOR SHALL IN STALL SILT FENCE FOR EROSION CONTROL AS SHOWN AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH DERMS MAY BE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCE IF DISPOSED MATERIAL IS TRANSPORTED HYDRAULICALLY TO THE DISPOSAL SITE.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY !

4.) PROPERTY OWNER WILL BE RESPONSIBLE FOR FINAL GRADING AT DISPOSAL SITES.

ITEM# 1 E. FLANGE BOLT OF FIRE HYDRANT EL. 704.15
NORTHEAST CORNER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 32, TOWNSHIP 27 NORTH, RANGE 3 WEST

FILL VOLUME = 78,200 CYS

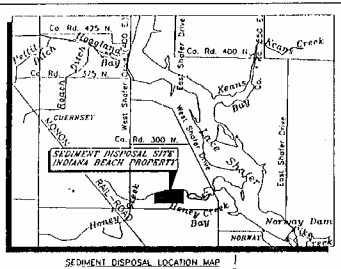
NOTE:
EXISTING MOUNDS SHOWN ON THIS SURVEY ARE TEMPORARY AND MAY BE CHANGED ON A DAILY BASIS.

COMMONWEALTH ENGINEERS, INC.

LAKE SHAPER LAKE ENHANCEMENT PROJECT PHASE II
TRIBUTARY LAKE SEDIMENT BASINS

DISPOSAL SITE
SEDIMENT DISPOSAL SITE

DRAWING NO. 7



SEDIMENT DISPOSAL LOCATION MAP
N.T.S.

NOTE: CONTRACTOR TO DIVERT SITE DRAINAGE FROM WEST INTO RIPRAP CHUTE.

RIPRAP CHUTE (8' MIN.)

SILT FENCE (SEE DETAIL SHEET No. 11)

SILT FENCE (SEE DETAIL SHEET No. 11)

WOODED AREA

GRAVEL ROAD

IRM #1 RR SPIKE ON SOUTH SIDE OF 30"ø TREE EL. 104.34

IRM #2 RR SPIKE ON SOUTH SIDE OF POLE EL. 104.91

0 50' 100' 200'

INV. 87.22

HONEY CREEK

FIELD GATE

INV. 88.51

INV. 91.69

EL. 95.81

EARTH BERM

EARTH MOUND

CORN FIELD

FILL VOLUME = 25,259 CYS

GENERAL NOTES

1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AS MAY BE REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS ARE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCES.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY.

4.) CONTRACTOR WILL BE RESPONSIBLE FOR FINAL GRADING OF DISPOSAL SITE.

5.) CONTRACTOR TO CLEAR AND GRUB ALL TREES WITHIN THE LIMITS OF CONSTRUCTION.

6.) WITHIN LIMITS OF CONSTRUCTION CONTRACTOR TO STRIP AND STOCK PILE TOP SOIL PRIOR TO PLACEMENT OF DISPOSED MATERIAL. PRIOR TO FINAL GRADING OF SITE, FILLED AREA SHALL BE COVERED WITH 6" OF TOP SOIL.

7.) PRIOR TO CONSTRUCTION CONTRACTOR SHALL REMOVE ALL BRIARS, BUSHES, AND TREES IN PROPOSED FILL AREA.

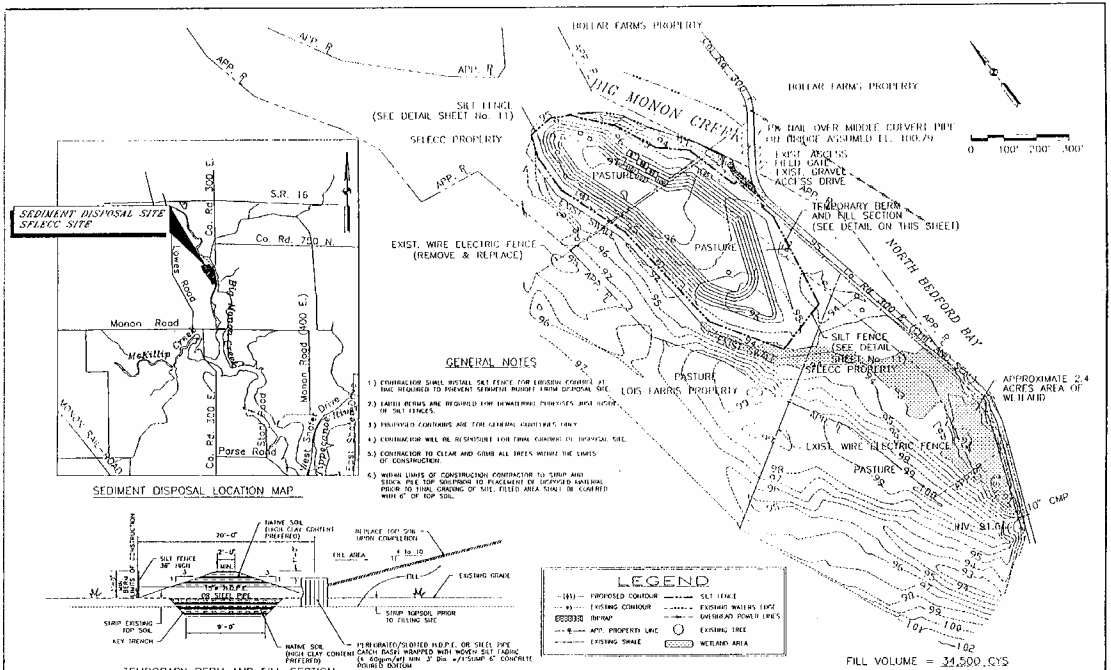
LEGEND

(81) PROPOSED CONTOUR	EXISTING WATERS EDGE
85 EXISTING CONTOUR	RIPRAP
FARM FIELD FENCE	EXISTING TREE
TP EXISTING TELEPHONE POLE	SILT FENCE

COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
SEDIMENT DISPOSAL SITE

DRAWING NO. 8

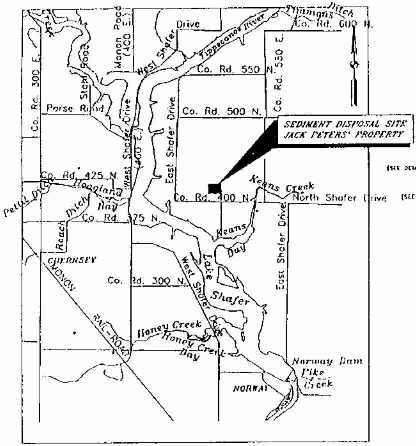


COMMONWEALTH ENGINEERS, INC.

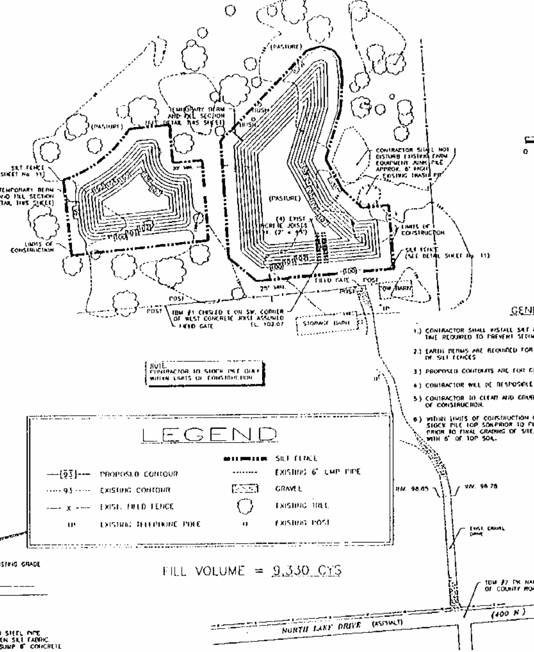
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
SEDIMENT DISPOSAL SITE
SEDIMENT DISPOSAL SITE SELECC PROPERTY

DRAWING NO. 9

9 OF 11



SEDIMENT DISPOSAL LOCATION MAP



FILL VOLUME = 9,330 CYS

GENERAL NOTES

1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

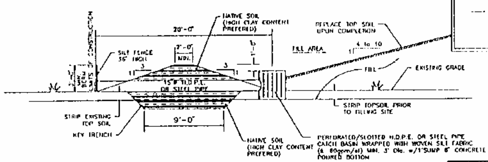
2.) EARTH BERMS ARE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCES

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY.

4.) CONTRACTOR WILL BE RESPONSIBLE FOR FINAL GRADING OF DISPOSAL SITE

5.) CONTRACTOR TO CLEAR AND GRUB ALL TREES WITHIN THE LIMITS OF CONSTRUCTION.

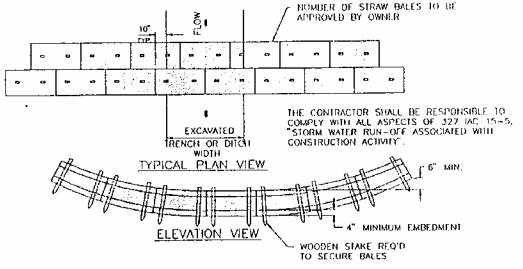
6.) WITHIN LIMITS OF CONSTRUCTION CONTRACTOR TO STRIP AND STOCK PILE TOP SOIL PRIOR TO PLACEMENT OF DISPOSED MATERIAL. PRIOR TO FINAL GRADING OF SITE, FILLED AREA SHALL BE COVERED WITH 6" OF TOP SOIL.



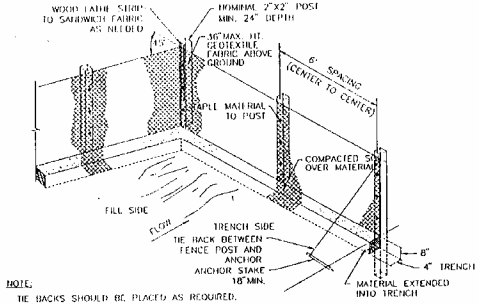
TEMPORARY BERM AND FILL SECTION
NO SCALE

COMMONWEALTH ENGINEERS, INC.

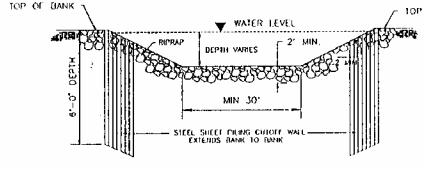
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS	DRAWING NO
SEDIMENT DISPOSAL SITE PETERS PROPERTY	10



STRAW BALE DAM
N.T.S.

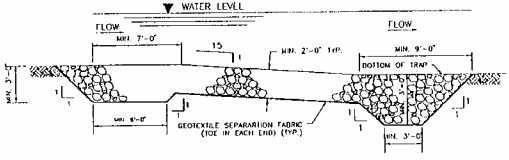


SILT FENCE DETAIL
N.T.S.

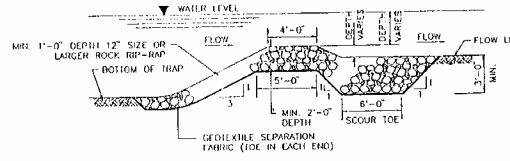


EXCAVATED CHANNEL SEDIMENT BASIN WITH SHEETING
N.T.S

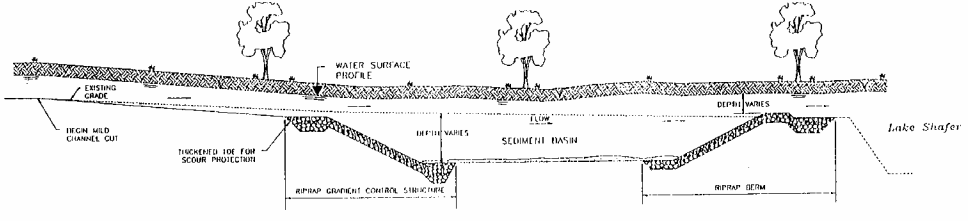
COMMONWEALTH ENGINEERS, INC.	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I MIDWAY BAY SEDIMENT BASINS	DRAWING NO.
	SEDIMENT TRAP DETAILS	11
	STANDARD DETAILS	



SECTION A-A
ROCK RIPRAP TYPE
GRADE CONTROL STRUCTURE
N.T.S.



SECTION B-B
ROCK BERM DETAIL
N.T.S.



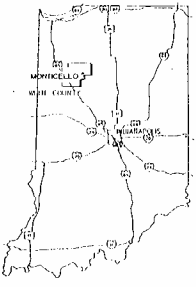
CHANNEL AND BAY PROFILE
N.T.S.

COMMONWEALTH ENGINEERS, INC.		LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE II TRIBUTARY BAY SEDIMENT BASINS	DRAWING NO.
		SEDIMENT TRAP DETAILS	11A
		STANDARD DETAILS	11A OF 11

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY

AUGUST, 1995

PLAN SHEET INDEX



PROJECT AREA LOCATION

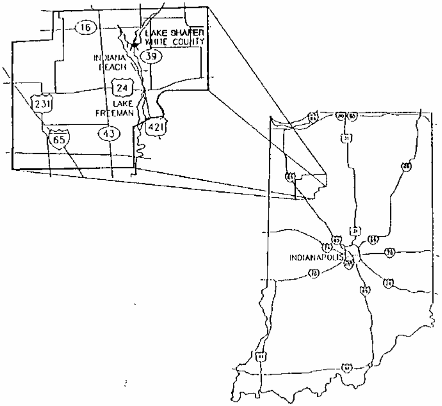
SHAFER AND FREEMAN LAKES
ENVIRONMENTAL CONSERVATION
CORPORATION

(219) 583-9784

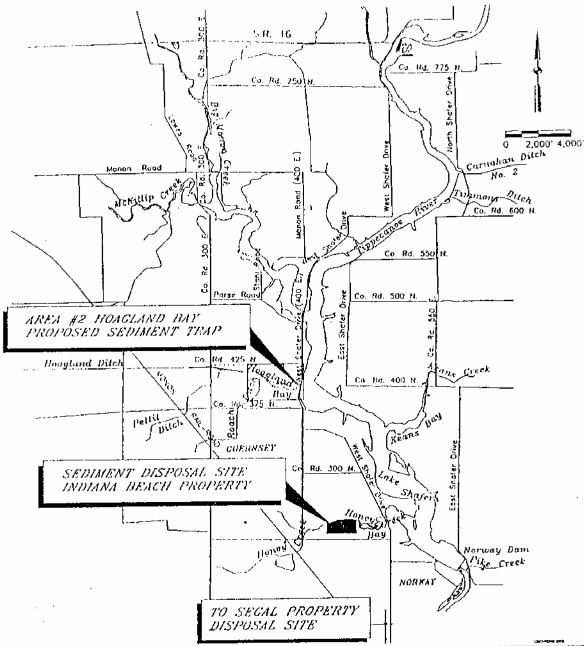
COMMONWEALTH
ENGINEERS, INC.

CERTIFIED BY: _____ DATE
G. EDWIN TINKLE II
INDIANA P.E. NO. 15130

PROJECT NO. 1C95801



PROJECT LOCATION MAP
NO SCALE



COMMONWEALTH ENGINEERS, INC.

AUG. 1995

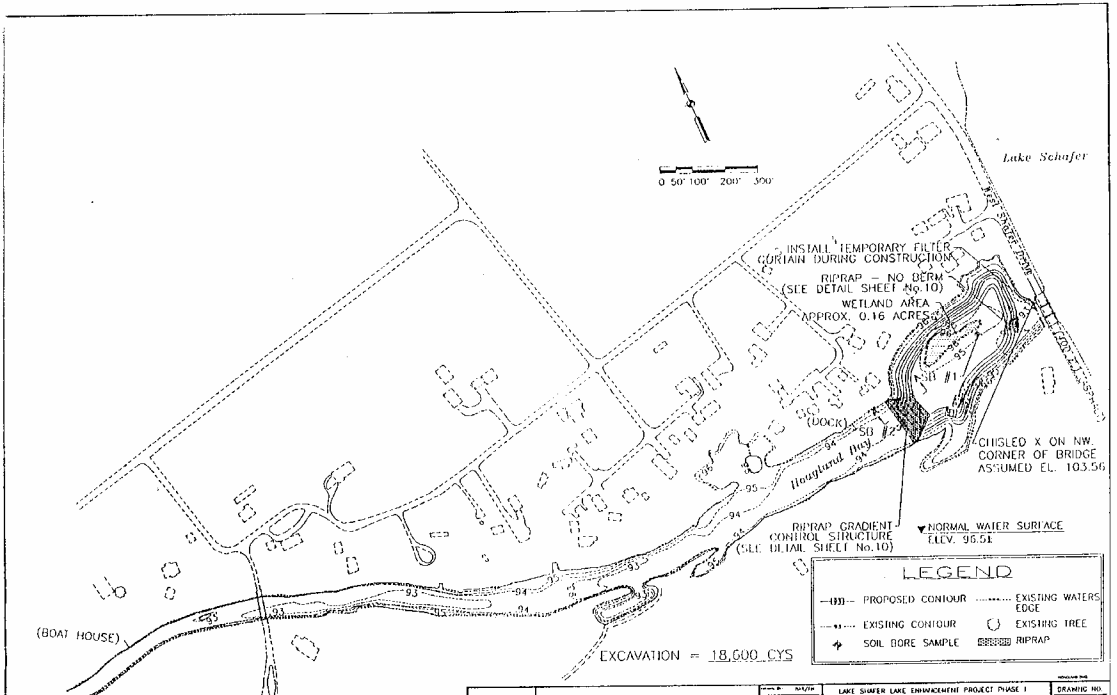
LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS

AREA 2 – HOAGLAND BAY

PROJECT LOCATION MAP AND DISPOSAL SITES

DRAWING NO.
2

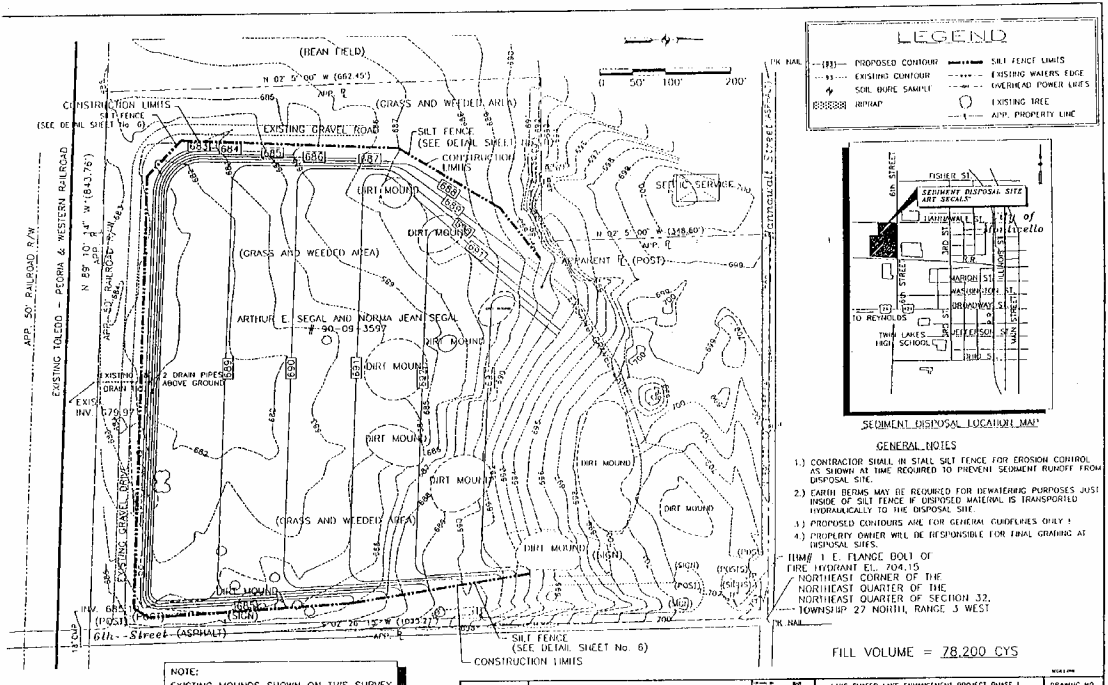
2 of 6



COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
AREA #2 - HOAGLAND BAY SITE PLAN

DRAWING NO. 3



NOTE:
EXISTING MOUNDS SHOWN ON THIS SURVEY ARE TEMPORARY AND MAY BE CHANGED ON A DAILY BASIS.

LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- SOIL BORE SAMPLE
- RIPRAP
- SILT FENCE LIMITS
- EXISTING WATERS EDGE
- OVERHEAD POWER LINES
- EXISTING TREE
- APP. PROPERTY LINE

SEDIMENT DISPOSAL LOCATION MAP

GENERAL NOTES

1.) CONTRACTOR SHALL IN STALL SILT FENCE FOR EROSION CONTROL AS SHOWN AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS MAY BE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCE IF DISPOSED MATERIAL IS TRANSPORTED HYDRAULICALLY TO THE DISPOSAL SITE.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY !

4.) PROPERTY OWNER WILL BE RESPONSIBLE FOR FINAL GRADING AT DISPOSAL SITES.

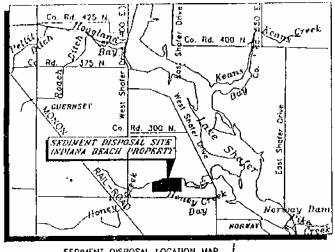
ITEM# 1 E. FLANGE BOLT OF FIRE HYDRANT EL. 704.15 / NORTHEAST CORNER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 32, TOWNSHIP 27 NORTH, RANGE 3 WEST

FILL VOLUME = 78,200 CYS

COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY LAKE SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
SEDIMENT DISPOSAL SITE
SEGAL PROPERTY

DRAWING NO. 4



SEDIMENT DISPOSAL LOCATION MAP
N.T.S.

NOTE: CONTRACTOR TO DIVERT SITE DRAINAGE FROM WEST INTO RIPRAP CHUTE.

RIPRAP CHUTE (8' MIN.)

SILT FENCE (SEE DETAIL SHEET No. 11)

WOODED AREA

GRAVEL ROAD

TBM #1 RR SPIKE ON SOUTH SIDE OF 30"ϕ TREE EL. 103.34

TBM #2 RR SPIKE ON SOUTH SIDE OF POLE EL. 104.91

SILT FENCE (SEE DETAIL SHEET No. 11)

HONEY CREEK

INV. 87.22

FIELD GATE

INV. 91.69

INV. 89.51

CORN FIELD

GENERAL NOTES

1.) CONTRACTOR SHALL INSTALL SILT FENCE FOR EROSION CONTROL AT TIME REQUIRED TO PREVENT SEDIMENT RUNOFF FROM DISPOSAL SITE.

2.) EARTH BERMS ARE REQUIRED FOR DEWATERING PURPOSES JUST INSIDE OF SILT FENCES.

3.) PROPOSED CONTOURS ARE FOR GENERAL GUIDELINES ONLY.

4.) CONTRACTOR WILL BE RESPOSIBLE FOR FINAL GRADING OF DISPOSAL SITE.

5.) CONTRACTOR TO CLEAR AND GRUB ALL TREES WITHIN THE LIMITS OF CONSTRUCTION.

6.) WHERE BARS OF CONSTRUCTION CONTRACTOR TO STRIP AND STOCK PILE TOP SOIL PRIOR TO PLACEMENT OF DISPOSED MATERIAL. PRIOR TO FINAL GRADING OF SITE, FILLED AREA SHALL BE COVERED WITH 6" OF TOP SOIL.

7.) PRIOR TO CONSTRUCTION CONTRACTOR SHALL REMOVE ALL BRIARS, BUSHES, AND TREES IN PROPOSED FILL AREA.

LEGEND

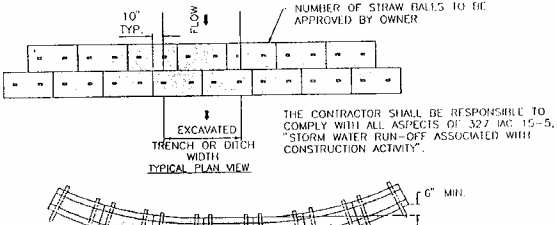
- PROPOSED CONTOUR
- EXISTING CONTOUR
- FARM FIELD FENCE
- EXISTING TELEPHONE POLE
- EXISTING WATERS EDGE
- RIPRAP
- EXISTING TREE
- SILT FENCE

FILL VOLUME = 25,250 CYS

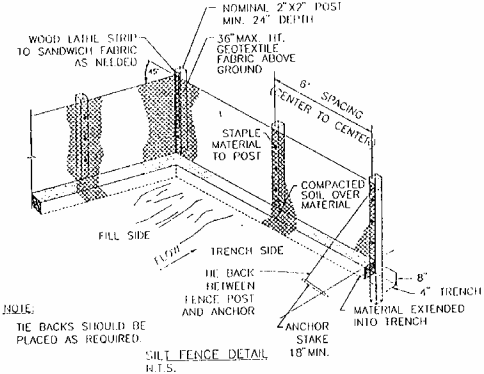
COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
SEDIMENT DISPOSAL SITE
INDIANA BRACH PROPERTY

DRAWING NO. 5



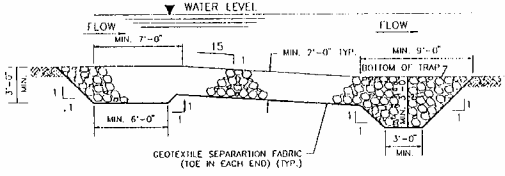
STRAW BALE DAM
N.T.S.



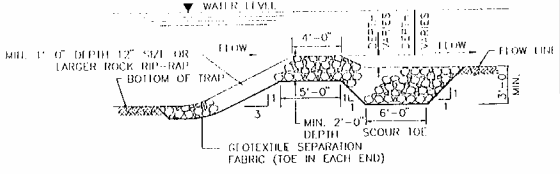
NOTE:
TIE BACKS SHOULD BE PLACED AS REQUIRED.

SILT FENCE DETAIL
N.T.S.

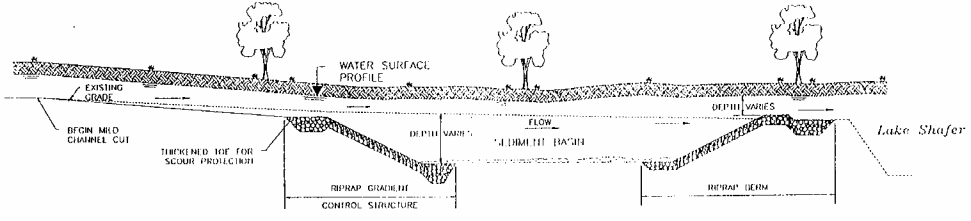
COMMONWEALTH ENGINEERS, INC.	LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I TRIBUTARY BAY SEDIMENT BASINS	DRAWING NO.
	AREA 2 - HOAGLAND BAY	6A
	STANDARD DETAILS	6A OF 6



ROCK RIPRAP TYPE
GRADE CONTROL STRUCTURE
N.T.S.



SECTION B-B
ROCK BERM DETAIL
N.T.S.



CHANNEL AND BAY PROFILE
N.T.S.

COMMONWEALTH ENGINEERS, INC.

LAKE SHAFER LAKE ENHANCEMENT PROJECT PHASE I
TRIBUTARY BAY SEDIMENT BASINS
AREA 2 - HOAGLAND BAY
STANDARD DETAILS

DRAWING NO. 6

APPENDIX "G"

IDNR PERMIT INFORMATION

Memorandum

To: Roger Kottlowski

From: John Wetzel

Date: November 2, 1995

Subject: Lake Shafer IDNR Certificates of Approval - Construction in a Floodway

---

Background

Initial information for the Permit Application for Construction in a Floodway regarding the Lake Shafer Project was sent from our office to the DNR on July 31, 1995. The information sent included the permit application, list of potentially effected parties, general location map, and a set of plans for 5 areas (Big Monon Bay, Hoagland Bay, Honey Creek, Carnahan Ditch, and McKillip Ditch). An application was made for each individual site. The sets of plans sent did not have any information regarding disposal sites for the areas. On Aug. 7, 1995, the above information was sent to the DNR for Keans Bay along with a check for the application fees for all 6 areas. Next, on September 5, 1995, a copy of all the Receipts of Certified Mail for the 6 areas was sent to the DNR. Lastly, on October 2, 1995, the Publishers Affadavit, confirming that a public notice for the 6 areas was printed in the Herald Journal (The White County paper), was forwarded to the DNR.

DNR Certificate of Approval - Construction in a Floodway

The tracking of each of the permits is listed in the following Table:

AREA	PERMIT APPLICATION SUBMITTED	CERTIFICATE OF APPROVAL RECEIVED
McKillip Ditch	Yes (July 31)	Yes (Oct. 20) '95
Keans Creek	Yes (Aug. 07)	Yes (Oct. 20) "
Big Monon Creek	Yes (July 31)	Yes (Oct. 20) "
Hoagland Bay	Yes (July 31)	Yes (Oct. 20) "
Carnahan Ditch	Yes (July 31)	Yes (Oct. 20) "
Honey Creek	Yes (July 31)	Yes ~~No~~ Feb 6, '96

On October 27, 1995, our office received the Certificates of Approval for Construction in a Floodway from the IDNR for the following five (5) areas: McKillip Ditch (Application #: FW-17040), Keans Creek (Application #: FW-17037), Big Monon Creek (Application #: FW-17039), Hoagland Bay (Application #: FW-17042), and Carnahan Ditch (Application #: FW-17038). The

Certificate of Approval for Honey Creek has yet to be received. The permit is valid for 24 months, if work is not initiated by October 20, 1997 permit will become void. Any deviation from the information given to the DNR must receive prior written approval from the Department.

Attached to the Certificate of Approval for each area was the Notice of Right to Administrative Review which states that the permit is subject to the "General Conditions" and "Special Conditions" and that the permit or any of its conditions mat be appealed. If an appeal is filed a legal proceeding must be conducted.

The General Conditions are the same for each permit and state basically the following:

1) If artifacts found work must stop and Div. of Historic Preservation and Arch. must be notified.
2) Permit must be posted at project site.
3) Permit does not relieve permitee of responsiblity of other permits, easements, etc.
4) Permit is not a waiver of any local, state or federal laws.
5) Permit does not relieve permitee liability of safety of others.
6) Permit may be revoked by the DNR if stated conditions are not met.
7) Permit is not transferrable without consent of DNR.
8) DNR has right to enter site and inspect authorized work.
9) Acceptance of permit also means acceptance of General and Special Conditions.

The Special Conditions are the same for each permit and state basically the following:

1) Revegetate all bare and disturbed areas.
2) No work in waterway from April1 through June 30 without written approval of the DNR.
3) Maintain sediment traps and clean out when they reach 50%-65% capacity.
4) Dispose of spoil at an upland site.
5) Utilize Hydraulic Suction Dredge only during normal water level.
6) Place all excavated material landward of floodway.
7) Do not leave felled trees, brush, or other debris in floodway.

Copies of the permit were sent to: SFLECC, CEI, White County Drainage Board, White County Soil and Water Conservation District, Division of Law Enforcement - IDNR, and Regulatory Functions Branch Louisville District - USACOE.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION #: FW-17,037

STREAM : Keans Creek - known locally as Lake Shafer

APPLICANT : Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

AGENT : Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

AUTHORITY : IC 14-28-1 with 310 IAC 6-1

DESCRIPTION : In association with the "Lake Shafer Lake Enhancement Project"; major tributaries to the lake will have sediment traps installed in them to control incoming sediments and silt. This application is for construction of a sediment trap in Keans Creek. A 2000' section of the creek will be excavated a max depth of 4'; a check dam composed of riprap will be constructed at the mouth and a riprap grade control structure will be constructed at the upstream end of the sediment trap. Details of the project are contained in plans and information received at the Division of Water on August 7, 1995, August 25, 1995, September 6, 1995, and October 3, 1995.

LOCATION : Beginning at the CR 400 N. bridge and continuing downstream for approximately 2,300' near Norway, Liberty Township, White County
NW¼, Section 9, T 27N, R 3W, Monticello North Quadrangle
UTM Coordinates: Downstream = 4516925 North, 519500 East, Upstream = 4517550 North, 519625 East

APPROVED BY :
for John N. Simpson, PE
Director
Division of Water

APPROVED ON : October 20, 1995

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: FW-17,037

This signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 310 IAC 0.6.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW-17,037

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
Louisville District, U.S. Army Corps of Engineers	(502) 582-5607
Indiana Department of Environmental Management	(317) 243-5035
White County Drainage Board	(219) 583-7883
Local city or county planning or zoning commission	Check local directory

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation, or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. John N. Simpson, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-4160, FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW-17,037

PERMIT VALIDITY: This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by October 20, 1997 the permit will become void and a new permit will be required in order to continue work on the project.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 7, 1995, August 25, 1995, September 6, 1995 and October 3, 1995. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes upon completion
(2)	do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife
(3)	implement best management land practices in the watersheds where sediment traps are installed. Maintain the sediment traps as needed; remove silt or sediment from the traps when they reach 50% - 65% capacity
(4)	dispose of spoil at an upland site only
(5)	during normal water level, utilize hydraulic suction dredge only
(6)	place all excavated material landward of the floodway
(7)	do not leave felled trees, brush, or other debris in the floodway

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SERVICE LIST

APPLICATION #: FW-17,037

Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

Regulatory Functions Branch
Louisville District, USACOE
c/o Mr. William Christman
P.O. Box 59
Louisville KY 40201-0059

White County Drainage Board
Attn: County Surveyor
P.O. Box 357
Monticello IN 47960

White County
Soil and Water Conservation District

Division of Law Enforcement, IDNR
North Region Headquarters (Dist 3)
c/o Capt. Steven Seemeyer
RR 6, Box 344
Peru IN 46970

Local Plan Commission

Staff Assignment
Administrative: Markita L. Shepherdson
Technical : Douglas L. McKinney
Environmental : Stephen H. Jose

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION #: FW-17,041

STREAM : Honey Creek - known locally as Lake Shafer

APPLICANT : Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello, IN 47960

AGENT : Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, IN 46237

AUTHORITY : IC 14-28-1 with 310 IAC 6-1

DESCRIPTION : In association with the "Lake Shafer Lake Enhancement Project"; major tributaries to the lake will have sediment traps installed in them to control incoming sediments and silt. This application is for construction of a sediment trap in Honey Creek Bay. A 940' section of the bay will be excavated a maximum depth of 4'; the resulting spoil,temporarily, will be placed on a peninsula extending into the bay at the site; riprap grade control structures will be constructed in the two incoming channels (split flow) at the upstream inlets of the sediment trap. Details of the project are contained in plans and information received at the Division of Water on August 7, 1995, August 25, 1995, September 6, 1995, and October 3, 1995.

LOCATION : Beginning at the West Shaffer Drive bridge and continuing upstream (southwest) approximately 940' near Norway, Union Township, White County
NE¼, SE¼, Section 17, T 27N, R 3W, Monticello North Quadrangle
UTM Coordinates: Downstream = 4515100 North, 518925 East, Upstream = 4514950 North, 518700 East

APPROVED BY :
John N. Simpson, PE
Director
Division of Water

APPROVED ON : February 6, 1996

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: FW-17,041

This signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 310 IAC 0.6.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW-17,041

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
Louisville District, U.S. Army Corps of Engineers	(502) 582-5607
Indiana Department of Environmental Management	(317) 243-5035
White County Drainage Board	(219) 583-7883
Local city or county planning or zoning commission	Check local directory

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation, or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. John N. Simpson, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-4160, FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW-17,041

PERMIT VALIDITY: This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by February 6, 1998 the permit will become void and a new permit will be required in order to continue work on the project.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 7, 1995, August 25, 1995, September 6, 1995 and October 3, 1995. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes as soon as possible upon completion
(2)	do not work below normal water level from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife
(3)	implement best management land practices in the watersheds where sediment traps are installed. Maintain the sediment traps as needed; remove silt or sediment from the traps when they reach 50% - 65% capacity
(4)	dispose of spoil at an upland site only
(5)	during normal water level, utilize hydraulic suction dredge only
(6)	place all excavated material landward of the floodway
(7)	do not leave felled trees, brush, or other debris in the floodway

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SERVICE LIST

APPLICATION #: FW-17,041

Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello, IN 47960

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis, IN 46237

Regulatory Functions Branch
Louisville District, USACOE
c/o Mr. William Christman
P.O. Box 59
Louisville KY 40201-0059

White County Drainage Board
Attn: County Surveyor
P.O. Box 357
Monticello IN 47960

White County
Soil and Water Conservation District
103 Country Lane
Monticello IN 47960-1800

Division of Law Enforcement, IDNR
North Region Headquarters (Dist 3)
c/o Capt. Steven Seemeyer
RR 6, Box 344
Peru IN 46970

White County Plan Commission
PO Box 851
Monticello IN 47960

Staff Assignment
Administrative: Markita L. Shepherdson
Technical : Douglas L. McKinney
Environmental : Stephen H. Jose

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION #: FW-17,042

STREAM : Hoagland Bay - known locally as Lake Shafer

APPLICANT : Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

AGENT : Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

AUTHORITY : IC 14-28-1 with 310 IAC 6-1

DESCRIPTION : In association with the "Lake Shafer Lake Enhancement Project"; major tributaries to the lake will have sediment traps installed in them to control incoming sediments and silt. This application is for construction of a sediment trap in Hoagland Bay. A 550' section of the bay will be excavated a max depth of 7'; a check dam composed of riprap will be constructed 550' upstream of West Shafer Drive (400 E) at the upstream end of the sediment trap. Details of the project are contained in plans and information received at the Division of Water on August 7, 1995, August 25, 1995, September 6, 1995, and October 3, 1995.

LOCATION : Beginning at the West Shaffer Drive bridge over the stream and continuing upstream (west) approximately 550' near Norway, Union Township, White County
SE¼, SE¼, SE¼, Section 6, T 27N, R 3W, Monticello North Quadrangle
UTM Coordinates: Downstream = 4517600 North, 517300 East, Upstream = 4517600 North, 517125 East

APPROVED BY :
John N. Simpson, PE
Director
Division of Water

APPROVED ON : October 20, 1995

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: FW-17,042

This signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 310 IAC 0.6.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW-17,042

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
Louisville District, U.S. Army Corps of Engineers	(502) 582-5607
Indiana Department of Environmental Management	(317) 243-5035
White County Drainage Board	(219) 583-7883
Local city or county planning or zoning commission	Check local directory

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation, or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. John N. Simpson, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-4160, FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW-17,042

PERMIT VALIDITY: This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by October 20, 1997 the permit will become void and a new permit will be required in order to continue work on the project.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 7, 1995, August 25, 1995, September 6, 1995 and October 3, 1995. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes upon completion
(2)	do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife
(3)	implement best management land practices in the watersheds where sediment traps are installed. Maintain the sediment traps as needed; remove silt or sediment from the traps when they reach 50% - 65% capacity
(4)	dispose of spoil at an upland site only
(5)	during normal water level, utilize hydraulic suction dredge only
(6)	place all excavated material landward of the floodway
(7)	do not leave felled trees, brush, or other debris in the floodway

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SERVICE LIST

APPLICATION #: FW-17,042

Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

Regulatory Functions Branch
Louisville District, USACOE
c/o Mr. William Christman
P.O. Box 59
Louisville KY 40201-0059

White County Drainage Board
Attn: County Surveyor
P.O. Box 357
Monticello IN 47960

White County
Soil and Water Conservation District

Division of Law Enforcement, IDNR
North Region Headquarters (Dist 3)
c/o Capt. Steven Seemeyer
RR 6, Box 344
Peru IN 46970

Local Plan Commission

Staff Assignment
Administrative: Markita L. Shepherdson
Technical : Douglas L. McKinney
Environmental : Stephen H. Jose

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION #: FW-17,040

STREAM : McKillip Ditch - known locally as Lake Shafer

APPLICANT : Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

RECEIVED
OCT 27 1995
Commonwealth Engineers

AGENT : Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

AUTHORITY : IC 14-28-1 with 310 IAC 6-1

DESCRIPTION : In association with the "Lake Shafer Lake Enhancement Project"; major tributaries to the lake will have sediment traps installed in them to control incoming sediments and silt. This application is for construction of a sediment trap in Little Monon Bay. A 750' section of the bay will be excavated a maximum depth of 4'; riprap grade control structures will be constructed at both the upstream and downstream ends of the sediment trap. Also, upstream in McKillip Creek the right (south) streambank will be stabilized with riprap for approximately 520'. Details of the project are contained in plans and information received at the Division of Water on August 7, 1995, August 25, 1995, September 6, 1995, and October 3, 1995.

LOCATION : Beginning 175' upstream (west) of the C.R. 300 E., crossing over the stream, and continuing upstream (northwest) for a distance of approximately 3,200' near Monon, Monon Township, White County
SE¼, Section 25, T 28N, R 4W, Monticello North Quadrangle
UTM Coordinates: Downstream = 4521125 North, 515400 East, Upstream = 4521350 North, 515250 East

APPROVED BY :
for John N. Simpson, PE
Director
Division of Water

APPROVED ON : October 20, 1995

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: FW-17,040

This signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 310 IAC 0.6.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW-17,040

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
Louisville District, U.S. Army Corps of Engineers	(502) 582-5607
Indiana Department of Environmental Management	(317) 243-5035
White County Drainage Board	(219) 583-7883
Local city or county planning or zoning commission	Check local directory

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation, or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. John N. Simpson, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-4160, FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW-17,040

PERMIT VALIDITY: This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by October 20, 1997 the permit will become void and a new permit will be required in order to continue work on the project.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 7, 1995, August 25, 1995, September 6, 1995 and October 3, 1995. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes upon completion
(2)	do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife
(3)	implement best management land practices in the watersheds where sediment traps are installed. Maintain the sediment traps as needed; remove silt or sediment from the traps when they reach 50% - 65% capacity
(4)	dispose of spoil at an upland site only
(5)	during normal water level, utilize hydraulic suction dredge only
(6)	place all excavated material landward of the floodway
(7)	all work must conform with the existing bank at the upstream and downstream limits of the project site
(8)	do not leave felled trees, brush, or other debris in the floodway

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SERVICE LIST

APPLICATION #: FW-17,040

Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

Regulatory Functions Branch
Louisville District, USACOE
c/o Mr. William Christman
P.O. Box 59
Louisville KY 40201-0059

White County Drainage Board
Attn: County Surveyor
P.O. Box 357
Monticello IN 47960

White County
Soil and Water Conservation District

Division of Law Enforcement, IDNR
North Region Headquarters (Dist 3)
c/o Capt. Steven Seemeyer
RR 6, Box 344
Peru IN 46970

Local Plan Commission

Staff Assignment
Administrative: Markita L. Shepherdson
Technical : Douglas L. McKinney
Environmental : Stephen H. Jose

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION #: FW-17,039

STREAM : Big Monon Creek - known locally as Lake Shafer

APPLICANT : Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

AGENT : Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

AUTHORITY : IC 14-28-1 with 310 IAC 6-1

DESCRIPTION : In association with the "Lake Shafer Lake Enhancement Project"; major tributaries to the lake will have sediment traps installed in them to control incoming sediments and silt. This application is for construction of a sediment trap in North Bedford Bay. A 1,400' section of the bay will be excavated in a serpentine shape a maximum depth of 6'; a riprap grade control structure will be constructed at the upstream end of the sediment trap. Details of the project are contained in plans and information received at the Division of Water on August 7, 1995, August 25, 1995, September 6, 1995, and October 3, 1995.

LOCATION : Beginning 1,100' upstream (north) of the Monon Road (CR 650 N), crossing over the stream, and continuing upstream (north) for a distance of 2,500' near Monon, Monon Township, White County
NW¼, Section 30, T 28N, R 3W, Monticello North Quadrangle
UTM Coordinates: Downstream = 4522025 North, 515700 East, Upstream = 4522450 North, 515625 East

APPROVED BY: John N. Simpson, PE
Director
Division of Water

APPROVED ON : October 20, 1995

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: FW-17,039

This signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 310 IAC 0.6.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW-17,039

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
Louisville District, U.S. Army Corps of Engineers	(502) 582-5607
Indiana Department of Environmental Management	(317) 243-5035
White County Drainage Board	(219) 583-7883
Local city or county planning or zoning commission	Check local directory

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation, or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. John N. Simpson, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-4160, FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW-17,039

PERMIT VALIDITY: This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by October 20, 1997 the permit will become void and a new permit will be required in order to continue work on the project.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 7, 1995, August 25, 1995, September 6, 1995 and October 3, 1995. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes upon completion
(2)	do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife
(3)	implement best management land practices in the watersheds where sediment traps are installed. Maintain the sediment traps as needed; remove silt and sediment from the traps when they reach 50% - 65% capacity
(4)	dispose of spoil at an upland site only
(5)	during normal water level, utilize hydraulic suction dredge only
(6)	place all excavated material landward of the floodway
(7)	do not leave felled trees, brush, or other debris in the floodway

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SERVICE LIST

APPLICATION #: FW-17,039

Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

Regulatory Functions Branch
Louisville District, USACOE
c/o Mr. William Christman
P.O. Box 59
Louisville KY 40201-0059

White County Drainage Board
Attn: County Surveyor
P.O. Box 357
Monticello IN 47960

White County
Soil and Water Conservation District

Division of Law Enforcement, IDNR
North Region Headquarters (Dist 3)
c/o Capt. Steven Seemeyer
RR 6, Box 344
Peru IN 46970

Local Plan Commission

Staff Assignment
Administrative: Markita L. Shepherdson
Technical : Douglas L. McKinney
Environmental : Stephen H. Jose

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

CERTIFICATE OF APPROVAL
CONSTRUCTION IN A FLOODWAY

APPLICATION #: FW-17,038

STREAM : Carnahan Ditch - known locally as Lake Shafer

APPLICANT : Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

AGENT : Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

AUTHORITY : IC 14-28-1 with 310 IAC 6-1

DESCRIPTION : In association with the "Lake Shafer Lake Enhancement Project"; major tributaries to the lake will have sediment traps installed in them to control incoming sediments and silt. This application is for construction of a sediment trap in Carnahan Ditch. A 250' section of the creek will be excavated a maximum depth of 7'; a check dam composed of riprap will be constructed at the mouth and a riprap grade control structure will be constructed at the upstream end of the sediment trap. Details of the project are contained in plans and information received at the Division of ater on August 7, 1995, August 25, 1995, September 6, 1995, and October 3, 1995.

LOCATION : Beginning approximately 165' downstream (west) of the North Shafer Road, crossing over the stream, and continuing downstreram (west) a distance of approximately 415' near Buffalo, Liberty Township, White County
SW¼, SE¼, NE¼, Section 28, T 28N, R 3W, Monticello North Quadrangle
UTM Coordinates: Downstream = 4521625 North, 520250 East

APPROVED BY :
John N. Simpson, PE
Director
Division of Water

APPROVED ON : October 20, 1995

Attachments: Notice Of Right To Administrative Review
General Conditions
Special Conditions
Service List

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

APPLICATION #: FW-17,038

This signed document constitutes the issuance of a permit by the Natural Resources Commission, or its designee, subject to the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

The permit or any of the conditions or limitations which it contains may be appealed by applying for administrative review. Such review is governed by the Administrative Orders and Procedures Act, IC 4-21.5, and the Department's rules pertaining to adjudicative proceedings, 310 IAC 0.6.

In order to obtain a review, a written petition must be filed with the Division of Hearings within 18 days of the mailing date of this notice. The petition should be addressed to:

Mr. Stephen L. Lucas, Director
Division of Hearings
Room W272
402 West Washington Street
Indianapolis, Indiana 46204

The petition must contain specific reasons for the appeal and indicate the portion or portions of the permit to which the appeal pertains.

If an appeal is filed, the final agency determination will be made by the Natural Resources Commission following a legal proceeding conducted before an Administrative Law Judge. The Department of Natural Resources will be represented by legal counsel.

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

GENERAL CONDITIONS

APPLICATION #: FW-17,038

(1) If any archaeological artifacts or human remains are uncovered during construction, federal law and regulations (16 USC 470, et seq.; 36 CFR 800.11, et al) and State law (IC 14-21-1) require that work must stop and that the discovery must be reported to the Division of Historic Preservation and Archaeology within 2 business days.

Division of Historic Preservation and Archaeology
Room W274
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-1646, FAX: (317) 232-8036

(2) This permit must be posted and maintained at the project site until the project is completed.

(3) This permit does not relieve the permittee of the responsibility for obtaining additional permits, approvals, easements, etc. as required by other federal, state, or local regulatory agencies. These agencies include, but are not limited to:

Agency	Telephone Number
Louisville District, U.S. Army Corps of Engineers	(502) 582-5607
Indiana Department of Environmental Management	(317) 243-5035
White County Drainage Board	(219) 583-7883
Local city or county planning or zoning commission	Check local directory

(4) This permit must not be construed as a waiver of any local ordinance or other state or federal law.

(5) This permit does not relieve the permittee of any liability for the effects which the project may have upon the safety of the life or property of others.

(6) This permit may be revoked by the Department of Natural Resources for violation of any condition, limitation, or applicable statute or rule.

(7) This permit shall not be assignable or transferable without the prior written approval of the Department of Natural Resources. To initiate a transfer contact:

Mr. John N. Simpson, PE, Director
Division of Water
Room W264
402 West Washington Street
Indianapolis, Indiana 46204

Telephone: (317) 232-4160, FAX: (317) 233-4579

(8) The Department of Natural Resources shall have the right to enter upon the site of the permitted activity for the purpose of inspecting the authorized work.

(9) The receipt and acceptance of this permit by the applicant or authorized agent shall be considered as acceptance of the conditions and limitations stated on the pages entitled "General Conditions" and "Special Conditions".

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SPECIAL CONDITIONS

APPLICATION #: FW-17,038

PERMIT VALIDITY: This permit is valid for 24 months from the "Approved On" date shown on the first page. If work has not been initiated by October 20, 1997 the permit will become void and a new permit will be required in order to continue work on the project.

CONFORMANCE : Other than those measures necessary to satisfy the "General Conditions" and "Special Conditions", the project must conform to the information received by the Department of Natural Resources on: August 7, 1995, August 25, 1995, September 6, 1995 and October 3, 1995. Any deviation from the information must receive the prior written approval of the Department.

Number	Special Condition
(1)	revegetate all bare and disturbed areas with a mixture of grasses (excluding all varieties of tall fescue) and legumes upon completion
(2)	do not work in the waterway from April 1 through June 30 without the prior written approval of the Division of Fish and Wildlife
(3)	implement best management land practices in the watersheds where sediment traps are installed. Maintain the sediment traps as needed; remove silt or sediment from the traps when they reach 50% - 65% capacity
(4)	dispose of spoil at an upland site only
(5)	during normal water level, utilize hydraulic suction dredge only
(6)	place all excavated material landward of the floodway
(7)	do not leave felled trees, brush, or other debris in the floodway

STATE OF INDIANA
DEPARTMENT OF NATURAL RESOURCES

SERVICE LIST

APPLICATION #: FW-17,038

Shafer-Freeman Lakes Environmental
Conservation Corporation
P.O. Box 372
Monticello IN 47960

Commonwealth Engineers, Inc.
7256 Company Drive
Indianapolis IN 46237

Regulatory Functions Branch
Louisville District, USACOE
c/o Mr. William Christman
P.O. Box 59
Louisville KY 40201-0059

White County Drainage Board
Attn: County Surveyor
P.O. Box 357
Monticello IN 47960

White County
Soil and Water Conservation District

Division of Law Enforcement, IDNR
North Region Headquarters (Dist 3)
c/o Capt. Steven Seemeyer
RR 6, Box 344
Peru IN 46970

Local Plan Commission

Staff Assignment
Administrative: Markita L. Shepherdson
Technical : Douglas L. McKinney
Environmental : Stephen H. Jose